

REFERENCE COPY

JUNE, 1959

\$1

ARMED FORCES management

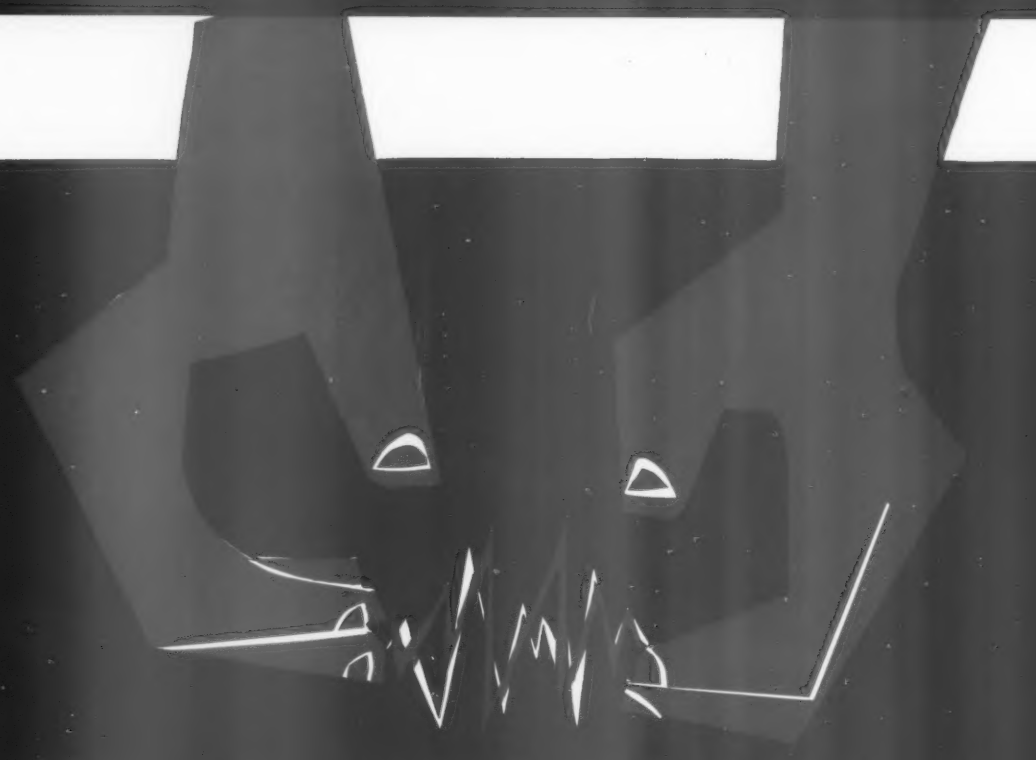
PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS



The Case for Military Assistance p. 13

How to Stop Civil Service Empire Building p. 30

complete contents ... p. 3



FRANKLIN "ONE FLUID" and the IONOSPHERE

Creative Imagination enabled Benjamin Franklin to orient all the observed electrical phenomena to his own "one fluid" theory—the basis of all our comprehension of electricity today.

At National Co. creative imagination is continuing to broaden our comprehension of the physical universe and apply it to the realization of such new means of communication as Ionospheric scatter systems.

The implications and applications of such new means of communication are vast.

National Co. is a community of minds and talents that enjoys the challenge and the prestige of success in such advanced fields as multipath transmission, noise re-

duction, correlation techniques for signal processing, Tropospheric scatter systems, Ionospheric scatter systems, molecular beam techniques, long range microwave transmission, and missile check-out equipment using microwave and digital techniques.

National Co. has grown with the Tradition of New England electronics. Your needs and problems receive exceptional attention at National Co. because, here, *creativity is required, recognized and rewarded.*

Write or phone

tuned to tomorrow **NationalND**®

National Company, Inc., Malden, Mass.

MANUFACTURERS OF MATERIEL AND EQUIPMENT FOR U. S. DEFENSE

NOW- PAN AM CARGO CLIPPERS SPAN THE PACIFIC

New All-Cargo flights from San Francisco to Honolulu and Manila—plus expanded Clipper* Cargo service to Tokyo and all the Pacific!

This is a success story. And it can apply to you.

It is the story of hundreds of firms whose goods are sold in—or derived from—distant Pacific markets—and whose shipping was done via Pan Am.

With the resultant speed, savings and certainty of Clipper Cargo shipping to give them trading advantages, profits and volume climbed.

Only the firms concerned know the full amount of profit increase.

But you can SEE the volume gain in the fact that Pan Am Cargo Clippers are being added to those runs.

In short, this increase in Pan Am service actually has been dictated by the growing demands of these far-off markets.

That's the latest success story on Clipper Cargo shippers. A sequel to it is waiting to be written for you.

Call your cargo agent, freight forwarder or Pan Am (in New York, **STillwell 6-7341**; in San Francisco, **EXbrook 7-1414**; in Los Angeles, **MADison 9-3292**).

PAN AM CLIPPER CARGO

— FASTEST DELIVERY TO ALL THE WORLD —

*Trade Mark, Reg. U. S. Pat. Off.



JUNE 1959

1

A FLEET OF CAT DW21s RUSHES A 12,000-FT. B-52 RUNWAY



The throaty roar of 20 fast-stepping Caterpillar DW21s mingled with the whine of B-52 Strategic Air Command bombers at Beale Air Force Base, Marysville, Calif. They were building a 12,000-foot runway for the big birds. The DW21s loaded, hauled and dumped rock and clay 18 hours a day. Contractors were: R. A. Westbrook, Inc., Morrison-Knudsen Co., Inc., and H. Earle Parker, Inc.

And now the DW21 is more powerful, more efficient, and more productive than ever. A new model (Series G) is available with a new 345 HP (maximum output) Super-Turbo Engine. It hits top

speeds of 22.6 MPH quickly for high-speed hauling. Matched to the Cat LOWBOWL Scraper it gives you fast loading of 19.5 cu. yd. struck, 27 heaped.

The Super-Turbo Engine incorporates a new Air Induction System, unique in diesel engine turbocharging. The new engine packs more air, aided by twin dry-type air cleaners and larger manifolds and an After-Cooler. In addition, a Pressure Ratio Control System broadens the performance of the Turbocharger over a complete range of operating speeds.

Today the Caterpillar DW21 is

the most economical buy in its class on the market. It is faster and stronger. And with the new exclusive Torsionflex seat (optional), operator efficiency is greatly increased. See it soon. The sooner you get the powerful new DW21 in action, the sooner you'll start getting bigger production on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

SUPER-TURBO POWER
—First in the Industry
—First in Performance

ARMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

June, 1959

Volume 5—No. 9

FEATURES

- The Case for Military Assistance 13
The positive side of MAP has been largely shouted down by those opposing the program. Author Lt. Col. Marshall Baker answers these emotional arguments with some hard-hitting facts.
- How SAC Maintains Communications Control 16
Keeping tabs on a world-wide striking force such as Strategic Air Command is no easy job—and there is no margin for error. This is how SACsters do the job.
- The Air Force Supply Revolution at Chateroux 18
An overhaul of the European Air Force Supply System is bringing fantastic results to the Air Force. This is how the new system works.
- Ballistic Missiles: Birthplace of the 1968 Logistics System? 22
The new problems that came with the new ballistic missiles may have given Air Force a new approach to logistics that will have a high payoff.
- EDP Solves a Problem at AMC 28
Electronic Data Processing is being used in many ways, to solve many different kinds of problems. This is one case history.
- How to Stop Civil Service Empire Building 30
Good criticism is constructive and to the point. In proposing a method to stop Civil Service empire building, this reader's comment fulfills both qualifications.
- Engineering Services: Buy or Build? 35
A fairly new industry, engineering services are beginning to mature. The potential is great, but there are problems.
- Progress Report on Navy's New Research Office 33
First steps have been taken by Navy down the road to an entirely new way of doing research business. While it will take some time to finish the job, this is the score to date.

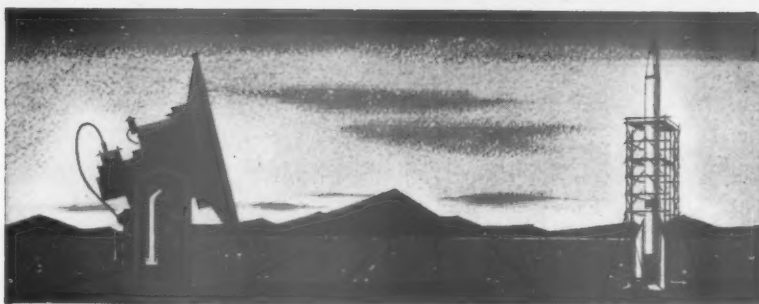
DEPARTMENTS

- | | | | | | |
|----------------------------|----|------------------------------|----|-----------------------------|----|
| In My Opinion | 4 | Research Rundown | 40 | Your Investment Future | 47 |
| Editorial | 5 | Pentagon Profile | 44 | Dates to Circle | 48 |
| Washington Background | 9 | Association Newsletter | 45 | Advertisers Index | 48 |
| Procurement Trends | 37 | | | | |

FEATURED NEXT MONTH

Special Electronic Data Processing Issue . . . How PERT Predicts for Navy . . . EDP and Marine Supply . . . Is EDP Worth the Trouble?

Published monthly by Professional Services Publishing Company, a subsidiary of American Aviation Publications, Inc., Washington, D.C. Printed at The Telegraph Press, Harrisburg, Pa. Accepted as controlled circulation publication at Harrisburg, Pa. and Washington, D.C. Copyright 1959 by the Professional Services Publishing Company. Title registered U.S. Pat. Off. Four weeks' notice before next publication date required for change of address. Subscription Price: \$10.00 a year in U.S. and Canada, \$15.00 overseas.



MIL-SPECS A GUIDE, NOT A GOAL

With approximately one thousand Military Specifications covering details of design, manufacture, and test of a guided missile and its components, it is startling to realize that, even by conservative estimates, over 80% of them are currently obsolete because of significant advances in the "state of the art". It is illogical to assume that Specs can be kept current, in view of the enormity of this task.

A heavy responsibility is imposed upon our industry because Mil-Specs lag so far behind the latest manufacturing technology and the stringent demands of the missile programs—some of which are yet unknown. Reliability must be a consideration in the design of electronic components, to a degree far beyond that specified by those outdated Specs . . . It must be the ultimate attainable with the best current production techniques.

Keeping precision components ahead of requirements is the greatest contribution any manufacturer can make toward solving this problem. Failure to recognize the necessity of producing the ultimate reliability possible can only result in inferior system performance, and tremendous loss of time and money.

Quantitative reliability must be the primary concern of management, designers, engineers, and production personnel. We must make a concerted effort to attain 100% reliability in each and every item. This means our research and development effort must: 1. be channeled along lines which constantly evaluate products in terms of operational performance; and 2. take advantage of every breakthrough in materials, design and manufacturing.



George J. Pandapas
George J. Pandapas
President

ELECTRO TEC CORP.

P. O. BOX 37P, SOUTH HACKENSACK, N. J.

Products of Precision Craftsmanship



For more facts request No. 113 on reply card.

In My Opinion

Valuable Contribution

Your article in the November issue of ARMED FORCES MANAGEMENT entitled "The Facts on Military Small Business Procurement," (by Bill Borklund) has been read by the Honorable Fred A. Bantz, Assistant Secretary of the Navy for Material. He has found it of considerable interest and feels that it is a valuable contribution to the understanding of this difficult field.

In the particular case of the Navy, about twenty percent of our procurement dollars go directly to small business as prime contractors. In addition, about twenty percent more is subcontracted at the first tier to small business by the other large prime contractors of the Navy. Accordingly, there is at least an equal emphasis placed by the Navy in our Small Business Program upon prime awards. We feel that both directions of effort are of the utmost importance.

Thank you again for sending us your interesting and valuable article.

Capt. F. A. Allis

Chief, Office of Small Business
Office of Naval Material.

Managing R&D

Thank you for . . . the article in your April 1 issue on "Managing R&D: Provide, Don't Prevent." It is interesting to note that several of the five steps outlined in the article are under continuous review and the Navy is doing what it can to solve the inherent problems. Unfortunately the five points are platitudes which must be rationalized within a democratic form of government, which requires checks and balances, and a civil service form of employment which is based on individual security of employment. In spite of this, I feel that our research laboratories are doing a Herculean job in this era of rapid technological expansion and that some of our most notable break-throughs, such as a space satellite, are the results of following within our limitations the five steps recommended in the article . . .

VAdm. J. T. Hayward

Deputy Chief of Naval Operations
(Development)

Editorial Praised

Your editorial in the May ARMED FORCES MANAGEMENT magazine ("The Authority to be Wrong") hits the nail on the head! I've spent nine of the last thirteen years in Washington (an EDO in BuShips). Keep up this kind of writing! The country needs it!

RAdm. L. V. Honsinger

Deputy and Assistant Chief of Bureau
Bureau of Ships

ARMED FORCES MANAGEMENT



Executive Editor
C. W. Borklund

Editorial Assistant
Fred Hamlin

Art Director
William H. Martin

Asst. Art Director
Bacil Guilley

Production
John Walen

Asst. Production Mgr.
Elsie Gray

Advertising Sales Manager
Arthur J. Newfield

Advertising Service Manager
Lee Martin

Circulation Manager
Eugene White

★

Wayne W. Parrish Publisher

Leonard Eisner . General Manager

Editorial and Advertising Offices:
1001 Vermont Ave., N.W.,
Washington 5, D.C.
Phone: STerling 3-5400.

★

Regional Advertising Offices

New York 17, New York
17 East 48th Street
PLaza 3-1100

Beverly Hills, Calif.
8929 Wilshire Blvd.
OLeander 5-9161

Chicago 2, Ill.
139 N. Clark St.
CEntral 6-5804

Detroit 2, Mich.
201 Stephenson Building
TRinity 5-2555

Geneva, Switzerland
Anthony Vandyk
European Direcor
10 Rue Grenus
Phone: 321044
Cable: AMERAV GENEVA

London W.I., England
Frank V. Norall
Norall & Hart
28 Bruton St.
GRovenor 8356

★

Unsolicited manuscripts should be accompanied by a stamped, self-addressed return envelope. Armed Forces Management does not assume responsibility for the return of any unsolicited material.



How Much Approval is Enough?

CONGRESS is becoming far too enamored with its ability to exercise executive authority, in effect, and both the President and top Pentagon officials owe it to themselves, if not to the nation, to start arguing back.

Latest Congressional confusion is being stirred by Richard Russell's (D-Ga.) Senate Armed Services Committee seeking authority to approve annually the military design, development and procurement of missiles and aircraft. The move, says Russell, is being made "to avoid waste and duplication." (The review, in itself, would duplicate the job of at least two other committees).

If Congress is really looking for things to do, its committees might well conduct a very lucrative investigation of each other. Congressional indulgence in waste and duplication while tilting its lance at waste and duplication elsewhere has made its crusade a farce—in too many cases of late.

More and more defense projects must regularly provide a detailed accounting and nit-pick approval from two or three committees in both houses of Congress. If we assume that the Pentagon is populated with thieves, this double-jeopardy-sort-of congressional inquiry might make sense. But, by the time any proposal has fought its way through a military Service, the Joint Chiefs of Staff, the Secretary of Defense, the Bureau of the Budget, and the White House (with an occasional oar in from the Government Accounting Office), the chances of thievery or unwanted duplication are pretty dim.

Too much of Congress can not seem to recognize that careful management does not (or should not) mean control by strangulation. There is no question but what Russell's dual check will slow down weapons development programs. Nor is his empire building effort an isolated instance. The U.S. Congress is thrusting itself into the business of making military decisions for the experts, seems less and less willing to admit that the Pentagon can be trusted to make the right military decisions on its own.

The result has been an agonizingly frustrating cacophony of overlapping, yammering preparedness, operations, appropriations, armed services, ways and means *ad infinitum* committees and subcommittees which very rarely alter a Pentagon decision significantly—but they do manage to gorge themselves on Pentagon time, talent and tempers needed far more vitally elsewhere and hold up the decisions for weeks, even months.

The argument here is not with the concept of Congressional approval. A certain amount of debate is necessary. As presently practiced, however, the committee investigation of Pentagon operations is ridiculous. Approving general philosophies is one thing. Detailed approval of minutia is a farce.

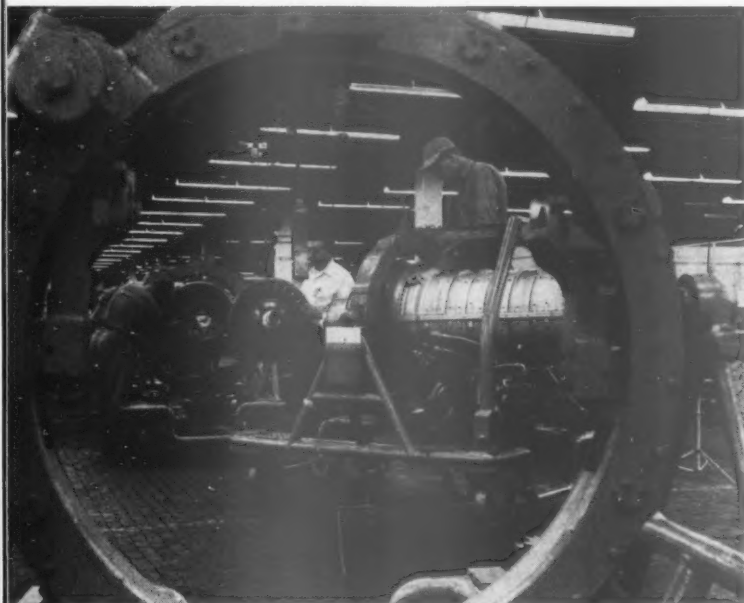
"Nuts-and-bolts" approval of the military budget is a case in point. The budget is a prediction in the first place, a generalized line item statement in the second. The money is never spent exactly as requested, let alone as approved, and the boys on Capitol Hill know it. Yet, Congress spends months chewing over the request, ends up without changing it more than a percentage or two.

The point of all this: we are over-controlled at the top, appallingly so, far more than any rational man can justify in the name of checks and balances in a democratic institution. If the Pentagon is ever going to become less of a management monstrosity, ever going to pare its size down to something more controllable, the impetus must come from Congress.

Until the Pentagon stands a little less in unjustifiable awe of the Hill, the current trend toward greater centralization of control by committee will not slacken. Until Congress demands a better management operation of the Pentagon, and shows by example that it knows the significance of what it is requesting, the Department of Defense will continue growing more unnecessarily complex, complicated and confusing.

Bill Borklund

Why Westinghouse designs advanced propulsion systems more rapidly, meets all requirements on time



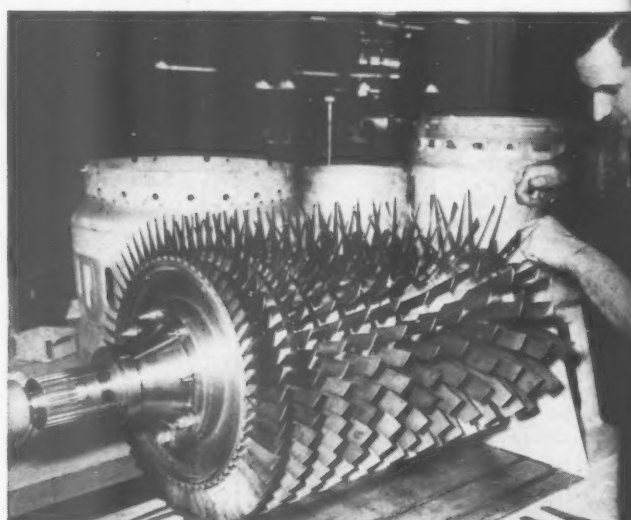
PRODUCTION POTENTIAL. The Aviation Gas Turbine Division at Kansas City has built more than 6,000 engines and associated spare parts. Engineering and Production experience with conventional gas turbine propulsion systems continues to be characterized by high-quality, on-schedule performance.



AUTOMATIC PRODUCTION TESTING, developed by Westinghouse, improves and speeds final pre-shipment testing. Test cell controls put engine through required tests automatically and record test results on the form prescribed for the engine log book.



FLIGHT TEST OPERATIONS. Following thorough component testing under simulated operating conditions in the Low and High Power Laboratories, Westinghouse engineers at the AGT Division's Flight Test Center at NAS Olathe, Kansas, test all propulsion systems under actual flight conditions.



EXPERIMENTAL DEPARTMENT. This specialized factory-within-a-factory converts ideas into working prototypes. Independent engineering, tool design, progress and material control, permit self-sufficiency. Above, blades of a test cell bound compressor rotor are checked for proper balance.

ROLLS-R
resident
technical
faster jet

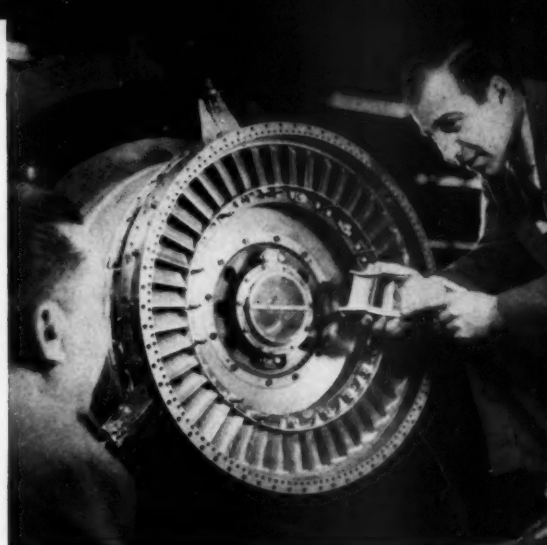
NEW F
from in
colored
flow an
perform
time-con
required
prototyp

LINE-R
of AG
This sy
produ

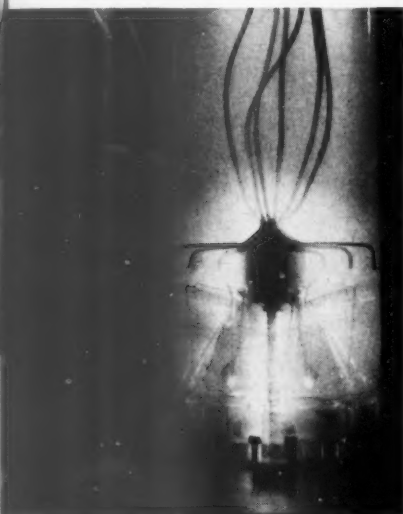
d

y West-
testing.
s auto-
bed for-factory
ng, tool
Above,
proper

ROLLS-ROYCE INFORMATION INTERCHANGE. A Rolls-Royce representative, resident at the AGT Division, here discusses new design concept with Westinghouse technical management. The Rolls-Royce-Westinghouse ten-year agreement permits faster jet engine design and production cycles.



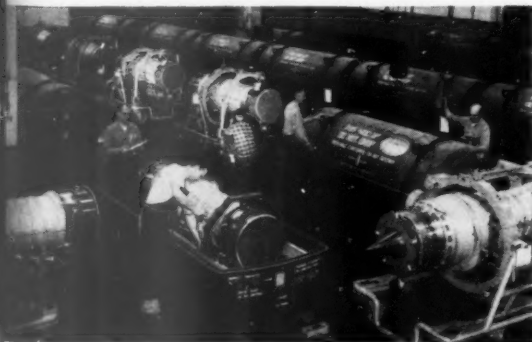
AIR-COOLED TURBINE NOZZLES permit more efficient operations at higher temperatures. Design permits air to enter through wide slots on one side, pass through interior, and leave through smaller slots along blade's trailing edge. This cools the vane and lets turbine operate at higher temperatures.



NEW FUEL INJECTOR DESIGN—fashioned from inexpensive plastic—is tested with colored water and air bubble mixture in this flow analogy test rig to predetermine its performance characteristics. Test minimizes time-consuming and costly testing previously required with expensive handmade metal prototypes.



VIBRATION AND STRESS ANALYSIS data are obtained in hours instead of days with this special Westinghouse-developed Strain Gage Analyzer. From signals recorded on 14 channel magnetic tape, the analyzer plots multiple continuous curves visualizing vibration frequency and strain at varying engine speeds.



LINE-FLOW PRODUCTION. The 85-acre Kansas City plant of AGT is well adapted to line-flow production techniques. This system permits smoother and more efficient engine production . . . a characteristic of quality performance.

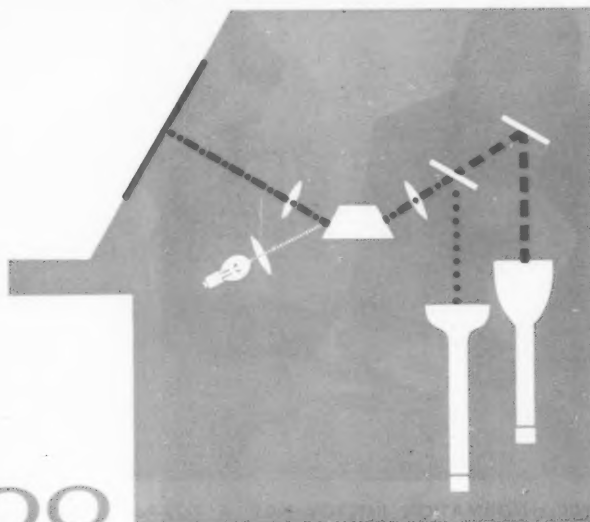
Westinghouse

DEFENSE PRODUCTS

1000 CONNECTICUT AVENUE, N. W., WASHINGTON 6, D. C.

AIR ARM DIVISION
AVIATION GAS TURBINE DIVISION
ELECTRONICS DIVISION
AIRCRAFT EQUIPMENT DEPARTMENT
ORDNANCE DEPARTMENT

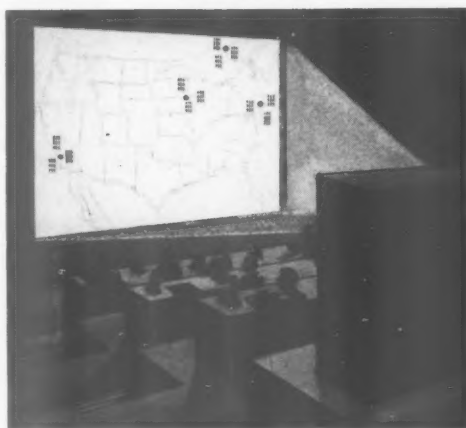
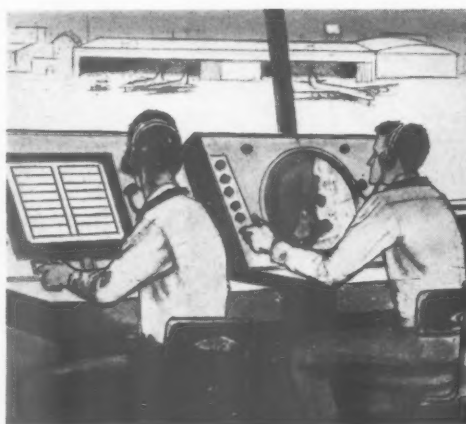
YOU CAN BE SURE... IF IT'S Westinghouse



S-C 2000 BRIGHT DISPLAYS FOR CONSOLE OR LARGE SCREEN PROJECTION

Bright, fail-safe, flicker-free display of alphanumeric, symbolic and graphic data at high speed . . . simultaneously with PPI-type radar presentations . . . is now provided by S-C 2000 Bright Displays. Displayed data may be viewed in normal ambient light directly on the screen of the S-C 2000 console, or may be projected for group viewing on a large theatre-type screen. For air traffic control and military applications, maps may be displayed concurrently with radar targets and their identifying symbols, assisting the operator in geographic orientation. The fail-safe feature of S-C 2000 Bright Displays results from use of the xerographic process which allows the last frame displayed to be retained permanently, even in event of complete power failure. Send for more complete information concerning S-C 2000 Bright Displays. Ask for Bulletin 6-F. Write today: Stromberg-Carlson — San Diego, 1895 Hancock Street, San Diego 12, California.

See the S-C 2000 Bright Display demonstrator at the AFCEA Show, June 3-5, Washington, D.C.—Booth 89.



GENERAL DYNAMICS
STROMBERG-CARLSON DIVISION



Washington Background

PENTAGON RUMOR MONITORS INSIST CURRENT RASH of "money waste" charges hurled by Government Accounting Office at Air Force and its contractors is a sort of "we'll show him" for the benefit of AF Secretary Douglas. Douglas had the (justifiable) temerity recently to refuse GAO access to a detailed study of AF missile costs. The question raised: is Air Force the willing victim of contractor thieves or is GAO a politically inspired hatchetman? Tune in next month.

DON'T BET TOO HEAVILY THAT ADVANCED RESEARCH PROJECTS AGENCY is on its way into oblivion. Chances of ARPA being axed are "extremely dim." Said a top Pentagon official last week, "ARPA will be under fire as long as it exists—which will be for some time yet. But don't let all the smoke and flame confuse you. The bosses (McElroy and/or York) are well aware that 99% of it is politically inspired."

TOM GATES WILL BE THE NEXT SECRETARY of Defense, replacing Neil McElroy probably by year-end. So say informed Washington sources who argue convincingly that the appointment of Gates to Deputy SecDef is just a prelude to bigger things, will allow McElroy to leave the Pentagon house with an experienced man, get back to making soap—and money.

THE MARKED CHANGE in attitude among Army and Navy leaders in the last month indicates a concerted drive may be building to re-cut the budget pie. Many Washington observers, noting the similarity in their Capitol Hill testimony, interpret the current harmony as a concerted "help-each-other" drive to re-figure the percentage. (Air Force currently receives a shade under half the budget, the other Services and SecDef the rest.)

TOP-LEVEL STANDARDIZATION RESPONSIBILITY FOR MISSILES is still unassigned and Armed Forces Special Weapons Project (which now handles atomic ordinance standardization) is still the most likely recipient of the chore. Services have given much lip service but little action to the standardization idea unilaterally and their own logistics people (to name only one group) are starting to tear hair before SecDef.

ARMY IS NOT AT ALL HAPPY WITH THE WAY its civilian half is shaping up. In spite of high praise from the Civil Service Commission for its handling of the civilian side of its operation during 1958, the Army is not very pleased with itself, intends to correct such headaches as: a 1958 salary overpayment to civil service workers of some \$12 million; a survey finding that approximately 27% of its civilian supervisors are "markedly" deficient in some managerial area.

HOUSE FOREIGN AID APPROPRIATIONS SUBCOMMITTEE CHAIRMAN Otto Passman has declared war on what he termed "President Eisenhower's grossly inflated \$3.9 billion aid program," is now about halfway through item-by-item checks of the new program. Pentagon experts are concerned with possibility, in present tight budget times, that cutting military assistance portion is going to hamstring our overseas preparedness. (MAP is currently the cheapest defense for the dollar on the market, a key part of U.S. Defense plans.

What concerns Pentagon advocates of MAP most: bulk of current drive to halt foreign aid is being led by an outfit called the Citizens Foreign Aid Committee, an official-sounding lobby group whose membership cadre reads a lot like the "Fortress America" (isolationist) team of pre-World War II days.

DRAPER COMMITTEE REPORT, EXPECTED THIS WEEK, should help MAP advocates considerably, according to advance comments. The big question said a spokesman: will Congress believe a solid, fact-supported case for MAP or the mis-leading isolationist editorial against? So far, because it looks good in the headlines, Congress is buying the latter.

GAO HAS BUSY MONTH

In four separate rulings, General Accounting Office has determined that the Government has been overcharged by more than \$10-million in its aircraft and electronics contracts.

Coming under GAO guns were Westinghouse Air Arm Division (\$933,463), Lockheed Aircraft Corp., (\$4.1-million), McDonnell Aircraft Corp. (\$1.5-million), and Boeing Airplane Co. (\$5-million). In each case, the excessive cost, according to GAO, resulted from actual prices being less than original contractor estimates.

Following the series of GAO reports, Rep. F. Edward Hebert (D-La.), chairman of the House Military Investigations Subcommittee, expressed alarm "at the frequency with which this over-pricing occurs; and either the indifference or the ignorance of the government negotiators."

As a possible remedy for apparently consistent overpricing, GAO has recommended that Air Materiel Command adopt a correcting amendment in Air Force contracting and pricing instructions. Present instructions, said GAO, "encourage too great a reliance upon price proposals and other information furnished by contractors without, at the same time, sufficiently emphasizing the need for verification of the currency, completeness and accuracy of the data."

SENATE SEEKS BUDGET 'ROLE'

Senate Preparedness Committee wants to know "the exact role" played by Bureau of the Budget in forming the Defense budget and military program. Sen. Lyndon Johnson (D-Tex.), committee chairman, has questioned whether U.S. military posture is "being weakened because of non-military considerations." In this light, Johnson said testimony by service chiefs has been "far from comforting."

Johnson said that each of the service chiefs has expressed reservations about their own budget, and suggested that the two days they were given to check out the budget were inadequate for careful consideration.

The committee chairman raised questions about funds which have been withheld from Polaris, Minuteman, Hound Dog and other programs, in the face of the conceded 3-1 edge Russia has in ballistic missiles.

Johnson charged that "the budget was never considered—nor were decisions made—on a functional basis for the Defense Department as a whole, but were made on a service-by-service basis in relation to individual expenditure targets."

JET TRANSPORT NEEDS DUBIOUS

Wartime needs for jet transport aircraft will be fairly limited, because of inadequate facilities at about 75% of the world's airports, according to Defense Department. This, with economic factors, is creating a desire in the military for a buildup of a turboprop transport fleet, as opposed to the faster pure jets.

The same hearings revealed that Defense Department has a proposal in the works which would eliminate Military Air Transport Service from the passenger business.

Meanwhile, on the House floor, Rep. Charles Porter (D-Ore.) has urged formation of an air Merchant Marine fleet, using a commercial carrier nucleus which could

be rapidly expanded in wartime.

Porter called for tripling of the available airlift for military purposes, and said that this increase should be in the civil air fleet. He said he felt that the services could "make far greater use of civil airlift in peacetime," and said "it is difficult to see how the airlift capacity needed for an emergency will be available if it is not built up in moving peacetime traffic."

GATES NAMED; MAY SHOW TREND

The beginnings of a major switch in Defense planning and emphasis may be indicated by the recent appointment of Thomas Gates, former Secretary of the Navy, as Deputy Secretary of Defense. An outspoken advocate of increased limited war preparedness, Gates will be in a position to boost this on a Defense-wide basis.

At the service levels, particularly in Army and Navy, there has been growing feeling that "massive retaliation" has been over-emphasized to the detriment of other, less glamorous programs. With Gates as a possible top-level spokesman for the limited war philosophy, Pentagon sources feel that a change may be in the wind.

Thought behind such a change would appear to be summed up by one Army officer: "We have atomic warfare capability, but who wants to use it? Assuming an effective deterrent situation has been created, the only way Russia can make any gains is through limited warfare. A lot of people here feel we're not ready for this."

TOP SCIENCE POSTS FILLED

Dr. Clifford Furnas has been named vice-chairman of the Army Scientific Advisory Panel, replacing Dr. James McRae, who has been appointed chairman of the panel.

In another top-level appointment, Dr. Edwin Paxson, a senior member of the RAND Corp. staff, has been named Assistant Director of Defense Research and Engineering for Tactical Weapons. The new post was created by Defense Research Director Herbert York, as part of his overhaul of the functions in his office.

Five new members have also been named to the Army Scientific Advisory Panel. Joining the 60-member group will be Michael Gluhareff, Sikorsky Aircraft; Dr. Ernest McCormick, Purdue University; Dr. John Talbott, University of Buffalo; Dr. Ira Baldwin, University of Wisconsin; and Dr. William Everitt, University of Illinois.

"STRATEGIC FORCE" HINTED

Possibility of a "strategic forces command," which would include all present U.S. retaliatory systems and commands under a single head is in works at Joint Chiefs of Staff level. Under such a command would be merged all long range missile systems now controlled by the three separate services.

Defense Secretary Neil McElroy has acknowledged that operational control of the Polaris missile system is still "under consideration," but beyond this, Pentagon sources say that Defense Department is not advocating such a program. However, Washington kibitzers are giving "Strategic Command" a good chance, term it one more step in the slow, but steady, march toward service unification.

ARMED FORCES MANAGEMENT



Bloodhounds ready for launching during acceptance trials at Woomera

CROWN COPYRIGHT RESERVED

EFFECTIVE DEFENCE

More advanced Bloodhound for defence of UK confirms particular suitability for European defence needs

Already in operational service with the RAF and adopted by non-NATO Sweden, Bloodhound Guided Weapon System is now to be further developed for the RAF.

This developed Bloodhound possesses substantially increased operating range and altitude, with advanced technique ensuring still greater lethality at these increased ranges and heights. Low altitude performance is further improved to counteract the threat of low-flying targets.

By developing Bloodhound to meet a threat, the RAF is making use of an existing system which obviously has economic and operational advantages.

Proved in many hundreds of test firings; built by Europe's largest missile-manufacturing complex; and particularly suited

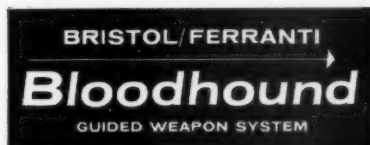
to European defence needs, Bristol/Ferranti Bloodhound forms *the world's most effective defence system now and for many years to come.*

Security forbids publication of full details, but the following facts about Bloodhound can now be given:—

Power. The Bloodhound is powered by two Bristol Siddeley ramjets—jet engines with no moving parts. Ramjets ensure power and range flexibility, burn kerosene, are simple and safe to handle.

Homing System. Semi-active: i.e., ground crew directs radar beam on to target, which is reflected to a receiver in Bloodhound, ensures highest accuracy—regardless of range. Missiles may be fired, singly or in salvoes, using only one radar.

Airframe. Employs unique and advanced monoplane moving wing configuration—two advantages:—quicker and more precise response, as well as greater accuracy of interception; superior at high altitudes. This configuration was selected at initial design stage to embody maximum development potential.



BRISTOL AEROPLANE CO (USA) INC
400 PARK AVENUE, NEW YORK 22, NY

WEAPON DESIGN AND CONSTRUCTION BY BRISTOL · GUIDANCE AND CONTROL BY FERRANTI
TARGET ILLUMINATING RADAR BY BTH · SYSTEM SALES ORGANISATION BY BRISTOL AIRCRAFT LIMITED

DYNA-SOAR



Dyna-Soar (for dynamic soaring) is a joint project between the Air Force and the NASA, and is an attempt to solve the technical problems of manned flight in the sub-orbital regions. Advance knowledge on the project indicates how a boost-glide vehicle can operate from the outer fringes of the atmosphere where it can maneuver and be recovered undamaged. Studies show that by varying the original rocket boost,

and thus the velocity, and with the control available to the pilot, the Dyna-Soar aircraft can circumnavigate the earth, followed by a normal and controlled landing. Boeing Airplane Company, one of the competing companies for the development contract for the complete boost-glide system, has delegated to RCA the responsibility for the development of important electronic components of Dyna-Soar.



Tmk(s) ®

RADIO CORPORATION of AMERICA

DEFENSE ELECTRONIC PRODUCTS

CAMDEN, N. J.

Much
mont
Beca
deter
other



The Case For Military Assistance

Much unthinking criticism has been directed in past months against the U.S. Military Assistance Program. Because MAP serves as one of our most effective deterrents against limited war, it is only fair that the other side of the story be heard.

by Lt. Col. Marshall E. Baker, USAF
Office, Assistant Secretary of Defense (ISA)

ONE has only to glance at the daily paper to get an idea of the controversy that surrounds the Military Assistance Program. The scope of opinion runs the entire gamut—from total Program abolition, to greatly increased assistance. The Draper Committee in its preliminary report to the President on the U.S. Military Assistance Program stated. "The only alternative we can see to the interdependent allied free world, strengthened by our aid where needed, would be the Fortress America concept—taking our first stand in the last ditch."

The Joint Chiefs of Staff recently said they would not want another dollar added to the United States defense budget if that dollar had to come out of MAP. Why is it that this vital feature of national security has become so controversial? What is the case for MAP?

Following World War II, the United States found itself in the title role of world leadership. This implied U.S. responsibilities in international affairs that few could have envisioned a decade earlier. However, haunted by the influence of our pre-war isolationism and burdened by an unwillingness to distrust a recent ally, it was not hard to rely on our atomic monopoly as an absolute guarantee for security. But with the steady descent of the iron curtain and the shock waves resounding from the first atomic blast in the USSR, a more realistic estimate of the situation began to develop.

The countries of Western Europe were unable, without help, to devote the necessary resources to develop the military strength that the situation demanded. They could, however, provide manpower and the strategic positions needed for common defense. The North Atlantic Treaty provided political adhesiveness and allowed development of a joint military command structure. MAP, although not designed solely for Europe, was shaped to fill the remaining gap with essential military equipment and advice.

Action to implement MAP had no more than begun when the global nature of the communist challenge was made unmistakably clear in Korea. There were many lessons learned from the events that unfolded in this remote area.

First, it was shown that the threat to the free world could not be assessed only in terms of direct Soviet aggression and subversive practices. Under the guiding hand of Moscow, other Communist nations would be used to exploit existing weaknesses in the defense posture of the free world.

Thwarted in Europe by NATO and the Mutual Security Program, the USSR focused increased attention on the less developed areas of the world. The concept of limited war forced itself into our military doctrine. The belief began to crystallize that international tension would be likely for many years to come. The "year of greatest danger" concept no longer seemed consistent with the nature of the threat.

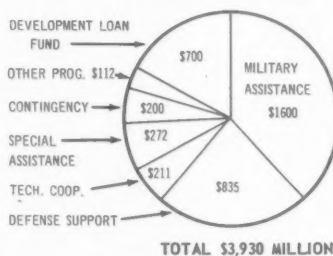
To help meet this critical situation, MAP was expanded to aid additional countries in the Near East and Far East. During the conflict in Indo-China and immediately thereafter, this effort was intensified. The roads to easy Communist victory had to be closed. Countries in these areas had to develop armed forces that could maintain internal security and withstand aggression at least until outside assistance arrived. The establishment of SEATO showed the determination of a number of these countries, collaborating with the U.S., France and the U.K., to participate actively in collective security. If the U.S. had failed to provide military and economic assistance at this crucial juncture, surely South-eastern Asia would have fallen to the Communists. Our position in the Far East would have been seriously undermined if not made untenable.

Since MAP effectively began in 1950—with two notable exceptions, Tibet and North Viet Nam, already heavily infiltrated by the Communists—international communism has not acquired any territory or additional populations through aggression, subversion, or revolution. Fourteen countries and some 700 million people came under Communist domination during the preceding six-year period.

MAP is only an instrument of U.S. foreign policy and forms an integral part of the total National Security Program. It has not been designed to provide a singular, simple means to guarantee free world collective security. To develop the military strength of a country without regard to its economy would be self-defeating. Conversely, to try to insure the economic development of a country without considering its military posture would pose an open invitation to a would-be aggressor. Thus, the Mutual Security Program, including MAP, encompasses economic-political considerations as well as those of military character.

It is sometimes said that the only real deterrent to Communist aggression is U.S. military strength. Proponents of this concept point out that U.S. forces are the most formidable in the free world and would assume virtually all of the burden in war. Therefore, they argue, our aid in developing allied military forces is fundamentally un-

FY 1960 APPROPRIATION REQUEST



Above, a pie-chart shows how Military Assistance Funds are spent.

This is what the money has bought. The strength increases are cheap insurance.

BUILD-UP OF U.S. AND ALLIED STRENGTH



sound and constitutes a needless burden on U.S. taxpayers.

But let's examine this Fortress America concept for a moment. Certainly, SAC is and will remain our foremost deterrent until missiles replace conventional delivery systems. However, for SAC to maintain its capability, it must rely on overseas bases, besides those in the U.S. Certain NATO countries, with Spain and Morocco, include bases in their contribution to the common defense. We assist in equipping the armed forces of these countries, and in some cases provide economic aid to help meet support costs. The mutuality of effort is obvious. Without such military and economic assistance by the U.S., these countries would be unlikely to share the risks in making bases available. Moreover, they could not provide the logistical, warning and defense facilities essential to the bases.

The same holds true for the overseas IRBM units supplementing the deterrent capability of SAC. Confidence in U.S. promises to assist in joint

defense is needed if our allies are to assume the risks which the Soviets say will be associated with the missile bases. Without our aid, they would lack both the confidence and the ability to support and defend these bases.

Besides the increased role that NATO countries are assuming in developing the nuclear deterrent, military aid has made it possible for these nations to develop and maintain strong conventional forces. These forces—and the integrated planning for their use—serve as an additional deterrent to aggression.

In less developed areas, MAP has helped maintain allied forces which deter local aggression. The Communists are less likely to commit such aggression if they know that the free world can effectively resist without having to resort to general war. The U.S. acting alone cannot do this, effective forces in the exposed countries are essential. These countries lack the resources to support such forces. They need military aid, as in Europe, and they also require support in meeting the budgetary costs.

Our common efforts to realize security will be ideally successful only if war is prevented. But there is no question that beyond our deterrent capability we must have survival insurance. The fine print in this policy must include measures to prevent erosion of freedom anywhere if Communist tyranny is not to engulf liberties everywhere.

Moderate critics have expressed concern over the weight given to military or economic assistance, especially in less developed areas. Balancing these two forms of assistance involves numerous imponderables, often including rapidly changing political, economic and military considerations. Thus, this aspect of program administration receives particular attention by responsible agencies in Washington and in the field. The Draper Committee is expected to cover this question in its final report. Its findings and recommendations should help the efforts to keep the program responsive to current conditions.

What has been Gained

The specific achievements and benefits largely attributable to MAP add formidably to the case. Some 250 major bases in strategic locations are available to our forces. The armies of our allies have increased from 3.6 million men in 1950 to 4.9 million men in the summer of 1958. The number of active and reserve combatant ships in allied navies increased from 1200 in 1950 to nearly 2500 in 1958, with some 1700 in active fleets or supporting units. Aircraft in allied air forces

number
1950;
to 30,
craft. T
proved
morale
These
have c
The de
total
words,
assista
have s
themse
The
or sym
Chines
Quemo
exampl
stroyed
before
record
tional
Sidevi
The
to dev
we ha
is sho
annual
and cl
the sa
year
soldier
soldier
\$412;
tionali
Dec
timing
compr
tailed
Chiefs
mande
of De
partm
and
funds
of the
Eve
militar
sional
is care
efficien
aid fu
such
sched
herent
to m
Quemo
The
militar
though
gram
signifi
omies
off-sh
been
allied
to res
enable
tion b
needs
JUNE

numbered 17,000, with 600 jets, in 1950; by June 1958 the number rose to 30,000, with nearly 14,000 jet aircraft. These forces also have vastly improved in training, equipment and morale.

These increases in military strength have cost the U.S. about \$22 billion. The defense expenditures of our allies total about \$141 billion. In other words, for every \$1.00 of military assistance, the MAP nations together have spent over \$6.00 to strengthen themselves.

The allied forces are not numbers or symbols. The performance of the Chinese Nationalist air force over Quemoy last year provides an excellent example. The Nationalist aircraft destroyed over 30 Communist planes before losing a single interceptor. This record was achieved *before* the Nationalist air force was equipped with Sidewinder air-to-air missiles.

The strength which MAP has helped to develop has cost far less than if we had tried to do the job alone. This is shown in part by comparing the annual cost of pay, allowances, food and clothing for a U.S. soldier with the same costs for our allies. Last year these costs for an American soldier were \$3,666. For a French soldier, they were \$1,440; a Pakistani, \$412; a Greek, \$424; a Chinese Nationalist, \$185.

Decisions on the type, amount and timing of aid provided result from comprehensive programming and detailed planning. The advice of the Joint Chiefs of Staff and U.S. overseas commanders is obtained. The Department of Defense, cooperating with the Department of State, evaluates political and economic implications. Finally, funds are spent only under Bureau of the Budget supervision.

Every step in the cycle, from initial military recommendations to congressional approval and program execution, is carefully matched to insure the most efficient and economical use of military aid funds. Deliveries are timed with such factors as priorities and training schedules for foreign personnel. Inherent in the process is the flexibility to meet such emergencies as the Quemoy crisis.

There are bonus benefits, other than military gains, derived from MAP. Although in some ways the military program is an economic burden, there are significant contributions to the economies of the aided countries. Through off-shore procurement, \$2.6-billion has been spent on military equipment from allied factories. This has allowed them to realize economic benefits, and has enabled them to expand their production base to supply more of their own needs. Military personnel have been

trained in skills with a common military and civilian application. Troops, trained through MAP, have built highways, bridges, and other communication facilities with civilian usage. These benefits are particularly significant in less developed countries.

Training foreign nationals makes an immeasurable contribution to the President's People-to-People Program. Students training in this country can see our institutions, participate in our cultural activities, and generally experience our way of life. Except for isolated instances, they have responded enthusiastically. There is mounting evidence to show that the impressions they carry away are aiding greater understanding and mutual respect between ourselves and our allies. Foreign students training at U.S. installations overseas and people in contact with Military Assistance Advisory Groups are likewise furthering this mutual understanding.

The Intangible Profits

While the necessity for MAP may be clear to most Americans, there are those who call it a give-away program and insist that funds involved should be spent at home. Assume we had done this—then ask these questions: (1) would the key nations of Europe have succumbed to Communism? (2) would the insurrectionists have taken over Greece? (3) could Turkey have stood alone against Soviet threats? (4) would Iran and Jordan be free today? (5) would the 21 nations that have become independent since World War II still be free of Communist domination? (6) would the Huks be in control in the Philippines? (7) would the Republic of Korea be a

satellite of Red China? (8) could the Chinese Nationalists have withstood the onslaught from the mainland? (9) what would be the present defense posture of the U.S.—and at what cost?

Little conjecture is needed to answer these questions plausibly. To dismiss the above logic as speculation would be like driving a brakeless car and assuming you would not have an accident.

MAP is not above criticism, nor should it be. Constructive criticism will continue to be extremely beneficial. In administering a program of this magnitude, with over 40 nationalities are involved, mistakes are inevitable. With appreciation of the problems involved, the Draper Committee had this to say:

"... while each blunder seemed worth a headline, the successes have made little news... The Committee states... that while mistakes have been made in the conduct of the program, a fair review must take into account the many difficulties inherent in such a complex and widely spread operation. It must also recognize that the errors have been largely in matters of detail. Most projects in the program have been well planned and successfully executed... To abandon the program, for errors in execution or for any other reasons, would be to abandon the free world and to lose the cold war."

During the ten years of MAP, the over-all Communist threat to the free world has not slackened. On the contrary, the challenge today is even more formidable. Economically and politically, the cold war has taken on increased intensity. Proven successful in the past, MAP continues today as an essential of our strategy for peace, security and general welfare.



Of great value is the training that is passed on to MAP countries, along with the equipment. By doing this, the value of the equipment supplied is greatly increased.



How SAC Maintains Communications Control

With the destructive power that the Strategic Air Command has in its arsenal, tight central control of the entire force is an absolute must. To do this, SAC maintains one of the most effective communications systems in the world, and is constantly working to improve what they have.

by Fred Hamlin

IT is common knowledge at the Omaha, Nebraska Headquarters of the Strategic Air Command that the officer who doesn't go down into "The Hole"—SAC's underground command post—every week or so is liable to get lost. The reason: the equipment of all kinds needed to keep SAC in its state of constant readiness is subject to continual change, and unless the officers keep up to date, the layout won't be the same when they revisit the underground complex.

Perhaps the one area where these changes take place with the greatest frequency is communications. A hint to why this is so comes from SAC Commander Gen. Thomas Power: "Without communications, I command only my desk. It's not very lethal, and I can't throw it very far."

To keep minute-by-minute tabs on an organization that circles the globe, and one that must handle the first and major attack in an all-out nuclear war, SAC has a communications task that is nearly overwhelming. The alert status that must be kept up in the underground SAC nerve center is perhaps more important than the job of the planes that fly the missions: if these planes don't get the order to go, they will have no way of knowing even when to begin their job.

It is for this reason that SAC demands—and is working to get—the best communications system in the world. Remarks one communications officer, "All we want is a system that will send the equivalent of 5000 words per second anywhere in the world we want it sent—and then acknowledge the message in five seconds." Adds another, "When we get that, we will want one that can handle 10,000 words per second."

There are two areas of communications in which SAC is interested. The first is voice communications, which

could be characterized as the wartime communications job. Second, and more important in the present deterrent situation, are written communications. Although the line between the two is not actually this clear (in wartime, for instance, written confirmation would follow spoken orders), these are the general areas for the two types of communications.

In the area of voice communications, SAC is pinning its present hopes on Single Side Band Suppressed Carrier, called SSB for short. "SSB," says one officer, "is limited only by our imagination." An indication of the potential of the system is demonstrated at SAC Headquarters, where, with the flick of a switch, SAC SSB operators can establish immediate contact with virtually all major SAC commands throughout the world.

The Voice Link

Originally brought to SAC by Gen. Curtis LeMay, SSB is now used as one means of direct voice communication between SAC headquarters and all major ground establishments that SAC maintains around the world—including installations in Turkey, Brazil, Guam, and posts throughout Europe and the United States.

From a technical standpoint SSB is neither new nor complicated. The idea was set forth in 1914. Although the theory has been used for some time with modifications on trans-Atlantic telephone circuits, it was not until Gen. LeMay, his Vice Commander, Lt. Gen. Francis H. Griswold and Dr. A. A. Collins of Collins Radio put it to use in SAC that it realized its full military potential.

Briefly, the SSB theory is this. A normal AM radio sends its signals on a carrier and two side bands. SSB concentrates all power on one of the side-

bands, doing away with the split power needed under the old system. and increasing usable power by a factor of 8 to 1. As a result, SSB has range and clarity comparable to code transmissions—the old standby of ham operators when all else fails. SSB also does away with what one SACaster calls "railroad radios, with a whistle at every station." This type of interference is completely eliminated with SSB. The equipment used in SSB is basically standard ham radio gear, with modifications.

Another, and one of the most important advantages in SSB is its flexibility—like the proverbial hydra-headed monster, SSB, for SAC's purposes, is practically impossible to kill. Behind this is an old radio technique—that of "patching in," or calling one station and having yourself transferred to another. Using this system, SAC can call all of its own SSB stations around the world, and it can hook in with virtually any telephone in the world, with a slight time lag. Because—using present technology—a complete SSB system can be built slightly larger than suitcase size, and will weigh only about 175 lbs., it will eventually be installed on all SAC aircraft.

In another phase of SAC's voice communications, there is probably no telephone in the world that enjoys such a wide reputation as the red alert phone on the desk of the Senior Controller in SAC's command post. This phone is a direct, hot line to every operational SAC base in the world. It is the telephone that will launch the Strategic Air Command, if or when the time comes.

"Contrary to the publicity about the red SAC telephone, there are two of them. Again, it is an indication of the constant change in SAC's communication system. Originally, the red telephone was simply a telephone—The

ARMED FORCES MANAGEMENT

communications controller picked it up, waited for an operator to plug in the circuits he wanted to reach, then made his call. SAC quickly realized that this wasn't fast enough, and installed a dial system, by which the controller could dial five numbers and after a brief pause for the circuits to be completed electronically, his connections were made. When this change was made, SAC installed a system for the bases called to acknowledge the message by throwing a switch which lighted a green light on a panel at SAC Hq.

This, said SAC communications men, was faster, but still not fast enough. And so the present system was developed. Today, by simply picking up the telephone, the SAC communications controller completes his circuit. The red telephone now hooks directly into an immediate, hot line to each of the SAC bases throughout the world.

To make sure the line remains hot, it is electronically checked every three seconds. A tone is sent out and returned to each of the many "other ends" of the line. If this tone fails to be returned three times in a row—a total of ten seconds—the results are immediately made known to whoever is in charge. Says one Command Post officer, "lights flash, bells ring, and a boxing glove punches the controller." If the reaction is actually less spectacular than this, it is not because the problem is less urgent. Without this system in working order, SAC is crippled, exactly to the degree that the system fails.

If voice communications are SAC's first line in the same sense that the aircraft are, it would be as unfair to overlook the mass of data communication needed to keep the force ready to go as it would be to overlook the ground support and supply crews that are needed to keep the planes on the alert flight lines.

The information provided by written communications includes: how many planes are ready to go, what's wrong with the ones that can't, and how soon SAC can count on the out of commission planes again. Briefly, what is the status of the force? This is currently handled on a world wide teleprinter circuit, with hookups to each of the numbered SAC Air Forces in the U.S. and all of its major overseas commands.

The Need for Volume

Information is sent to SAC headquarters on this teleprinting circuit, where it is reduced to workable form with an IBM 704 computer. From there, the data is hand carried to the SAC Command Post Control Room,

where it is posted "by men with grease pencils and pins."

Say SACsters of this system, "Not fast enough, not enough volume." The apparent answer to their problem is in the planning stage—the SAC Control System, called 465L. "The theory behind the system is set," says one SAC officer, "and all we need to do now is work out the details." In looking over their communications system, SAC's communications experts discovered that in spite of the efficiency of their teleprinter system, time was being lost in getting messages on the system, and then getting them off again. The answer, they felt, was an integrated communications system, which would take a given message from its point of origin, process it for transmission, transmit it, correlate it with other pertinent data, and take it to its final destination.

This is 465L. What the system will do is to convert as much of SAC's information as possible to a digital operation—one in which standardized computer language will be used to process and carry the necessary messages at the tremendous speeds for which computers are famous.

Basic parts for 465L are due to go into operation in the early 1960's, and when the system is completed, it will carry these messages from point of origin to SAC Headquarters, feed them to the 704-type computers, and automatically post them on the control panels which will be used to direct operations in the event of war. When it is fully operational, 465L will even do away with the man with the grease pencil and the pins, setting up a data display system which will probably be in many ways similar to Navy's NEWS warfare simulator in Newport, R.I. (See Nov. 1958, AFM).

465L could eventually be tied in with aircraft in SAC. The reasoning behind this is summed up by one officer. "We can program all routine or near-routine communications into 465L ahead of time. Anyone who has flown an airplane will tell you that 90% of your communications fall into these categories. On a combat mission, for instance, what we will need to know here at SAC is when they get going, how they are getting along to their targets, when they get to their target, and whether or not they make a complete kill. All of these are basically yes or no questions, and we feel that 465L may offer us the best way to get the planes going and keep score on them while they play the game. If we try to keep up with all this manually, either the war will have to last a long time or we will get whipped. Frankly, we've never worked with anything of

this scale before, and we don't yet know all that 465L will do."

An important by-product of 465L is stirring high hopes at SAC headquarters. Because of its computer nature, all or most of what goes into it will have to be pre-programmed. As a result, errors in transmission could be virtually eliminated.

While the SAC Control System—465L—will be the answer to many of SAC's problems, it is going to be some time before the system is ready to go. In the meantime, the work that has been done in relation to the teleprinter system on cryptology shows the constant work done to keep the system up to date.

Electronic Coding

In its earliest days, message coding was strictly a hand-operated system. This was eventually replaced by mechanical methods, and finally by electro-mechanical methods.

At SAC today, the teleprinters are equipped with electronic coding attachments. The message is simply typed into the machine as it would be in any situation. The machine automatically scrambles the message, punches a coded tape, sends out the coded message, and at the other end, the machines do the same thing in reverse. The sender and receiver deal only in simple English, and the machine makes sure that no message sent goes out in a language that can be read by anyone but the intended receiver.

The SAC Headquarters building has three stories above ground, a basement, and three more floors underground, which are entirely self-sufficient, and can be sealed off from the world and exist for 30 days under almost any conditions with no outside contact. And yet this building, with all of its furniture and fixtures thrown in, cost SAC less than one single B-52.

With this in mind, it is a tribute to SAC's emphasis on electronics and communications to note that from 5 to 6% of SAC's budget each year is spent in this area. Of SAC's 225,000 total strength, only about 12,500 work with communications and electronics. It is indicative of the rate of advance that SAC has managed with its communications technology that no more than this small number is needed.

The dual aim of SAC's communications system is for speed and reliability. It is through the same sort of work that has developed SSB and 465L that SAC will gain these goals, and continue to maintain communications which are needed by an organization as complex and vital as Strategic Air Command.

The Air Force Supply Revolution At Chateauroux

In Brief:

A revolutionary change in supporting European-based Air Force units is having terrific military and economic implications. Air Force has eliminated the overseas depot complex. Here's what this means:

1—Air Force and Military Assistance Program countries are being supplied direct from AMC in U.S.

2—Much of airpower maintenance is being handled by European and U.S. contractors.

3—Air Materiel Force, European Area, has commercial firms all over the continent and even in the Middle East handling work once done by AF depots.

by Anthony Vandyk

Chateauroux, France—Savings of at least \$30 million a year are resulting from the reorganization of the USAF's logistics set-up in Europe. Under the direction of Major General William T. Hefley, Commander of the Air Materiel Force, European Area, the USAF's logistics support system in this theater is now completing a radical change resulting in "greatly improved logistic support as well as substantially reduced costs."

Known as the Improved European Logistics Program, the new set-up was designed to take advantage of techniques developed by Air Materiel Command. The techniques: use of new rapid methods of communications, electronic data processing equipment and the managed use of airlift, sealift and normal transportation in order to eliminate the costly and vulnerable overseas depots of the USAF.

The basic idea was to provide more effective support to bases in the theater by bringing to the bases the stocks that they will need for the initial 75 days of an all-out war—the decisive phase. An essential part of the program was the provision of technical assistance to AMC European theater customers operating under the direct support program and the keeping of units in a better state of readiness than under the old system.

In addition to reducing the USAF's cost of logistics operations overseas by at least \$30 million a year, the Improved European Logistics Program is resulting in a further saving of at least \$90 million by eliminating stocks

that had to be maintained in overseas depots under the old 90-day supply pipeline system. Furthermore, U.S. personnel operating overseas have been considerably reduced, although the assistance and the support furnished to combat units and to AMC's Military Assistance Program nation—customers in Europe has been substantially increased.

To understand the Improved European Logistics Program it is necessary to go back to the period prior to August, 1956. Logistics support for the USAF and the Air Forces of the MAP countries was provided from three huge depots in the European theater—at Burtonwood, England; Nouasseur, Morocco; and Chateauroux, France.

Some 26,000 people ran these depots. Supplies came in to each depot from the U.S. for re-issue to tactical units. AMC found that this system was neither effective nor practical in terms of modern warfare. In wartime, thermonuclear weapons and the close proximity of the three depots to Soviet missile launching sites would make their value in wartime highly questionable. In peacetime, operations from these depots was not efficient. More than 50% of the time when an overseas base requisitioned an item from the depot, the depot did not have it and the requisition had to be forwarded to the U.S. This delay turned shortages into emergencies and required expensive airlift from the U.S. to get the part over in time.

Under the Improved European Logistics Program all three overseas

Result: MAP and NATO countries are less and less dependent on U.S. logistics support.

4—Savings in cost and personnel have been tremendous even though AMC support has improved. Example: AMFEA's personnel strength has dropped from 26,000 to 6,000.

5—Disposing of surplus materials but avoiding the post-WWII and Korea mistakes is a story in itself.

6—Today seven small Air Logistics Offices handle direct support and contract maintenance operations, furnish customer technical assistance.

depots are eliminated as overseas sources of supply. Said General Hefley: "We have cut out the middle man." All requisitions go direct to the AMC depot in the U.S. which has responsibility for the particular aircraft or item to which the requisition applies. Maintenance formerly done in overseas depots is being turned over to private contractors, thereby making use of the European industrial capacity.

By the end of 1958, all the depots were practically out of business. Nouasseur, which in November 1957



Maj. Gen. W. T. Hefley
Commander, Air Materiel Force,
European Area

had al
plies a
them,
stocks
less th
windin
85% o
govern
maind
a ret
costs
also I
their
depot
facilit
has al
Burton
British
come
well a
the A
(AMF
base.
has b
streng
some
down
Un
of th
Progr
canno
the c
U.S.
Logis
theate
Lo
blanc
and
nel s
peopl
distrib
oil, st

(000)
24
22
20
18
16
14
12
10
8
6
4
2
0
K
E
5

had almost \$200 million worth of supplies and over 1200 people handling them, had completely cleared its stocks a year later and cut its staff to less than 100 people who are now winding up the operation. No less than 85% of this material was put back into government channels while the remainder was sold as surplus, bringing a return of 12% of the acquisition costs. Burtonwood and Chateauroux also have almost completely cleared their inventories. By the end of June, depot level operations in all three facilities will be closed out. Nouasseur has already been turned over to SAC. Burtonwood is being returned to the British. Chateauroux is likely to become a support depot for NATO as well as remaining the headquarters of the Air Material Force, European Area (AMFEA) and an important MATS base. The effect of all these changes has been a reduction in AMFEA's strength from about 26,000 people to some 6,000. Headquarters strength is down to about 200.

Under the direct support concept of the Improved European Logistics Program all the logistics functions that cannot be handled directly between the customer and AMC depots in the U.S. are taken care of by seven Air Logistics Offices in the European theater.

Located in London, Madrid, Casablanca, Turin, Wiesbaden, Chateauroux and Athens, these ALOs have personnel strength varying from 60 to 250 people. They handle such functions as distribution of food supplies, gas and oil, store of ammunition plus the provi-

sion of technical assistance. (Under the technical assistant phase of the Improved European Logistics Program the MAP air forces in the European and North African-Middle East area are regularly sent AMC technicians who carry out detailed surveys of the logistics system in force and make "on the spot" recommendations for improvement.)

Except for the above-mentioned functions, performed by the ALOs, AMC European customers deal directly with AMC depots in the U.S. A key factor in making it possible to move the sources of supply from European depots back to the U.S. is the availability of an electronic system for requisitioning which cuts the process down to a matter of hours rather than days. Using transceivers, a punched card requisition is put into a machine on an air base in Europe. The same information comes out of a transceiver at the AMC depot in the U.S. which will supply the material. These machines can run through a whole set of cards in a few minutes, and the results are more accurate than if done manually. Most air bases in Europe are now equipped with transceivers. Their lines run to several gateway stations which transmit the requisitions across the Atlantic.

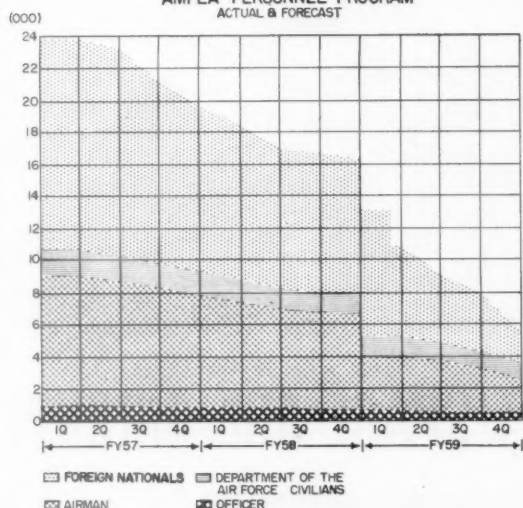
Although the supply of materiel can be handled directly from the U.S., some maintenance has to stay in the European theater for reasons of time and money. Simultaneously, therefore, with the phase-out of the European depots, contracts are being let in Europe to take over depot-level maintenance. Most of these civilian contrac-

tors are European companies, primarily well-known aircraft manufacturers and airlines.

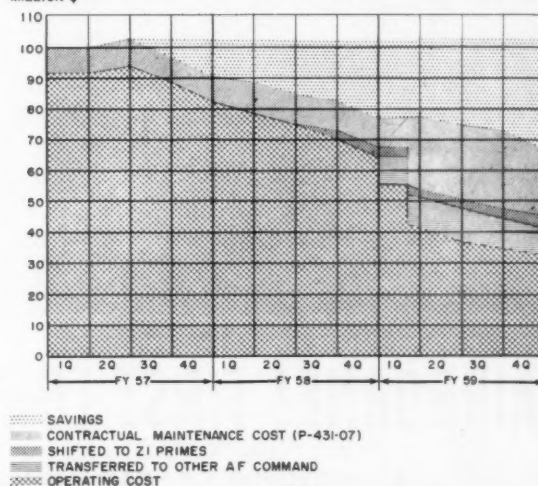
But in some cases U.S. firms have been brought in to supervise the work. For instance, at the facility at Deols, Chateauroux, management was switched last year from AMC to Aircraft Engineering and Maintenance Company of Oakland, California, which uses France's Breguet company as subcontractor to supervise the some 850 French personnel engaged on F-100 and F-84F repair and overhaul work. Although the Deols facility currently has only USAF as its customer, they hope the NATO air forces will start to take advantage of the services available there.

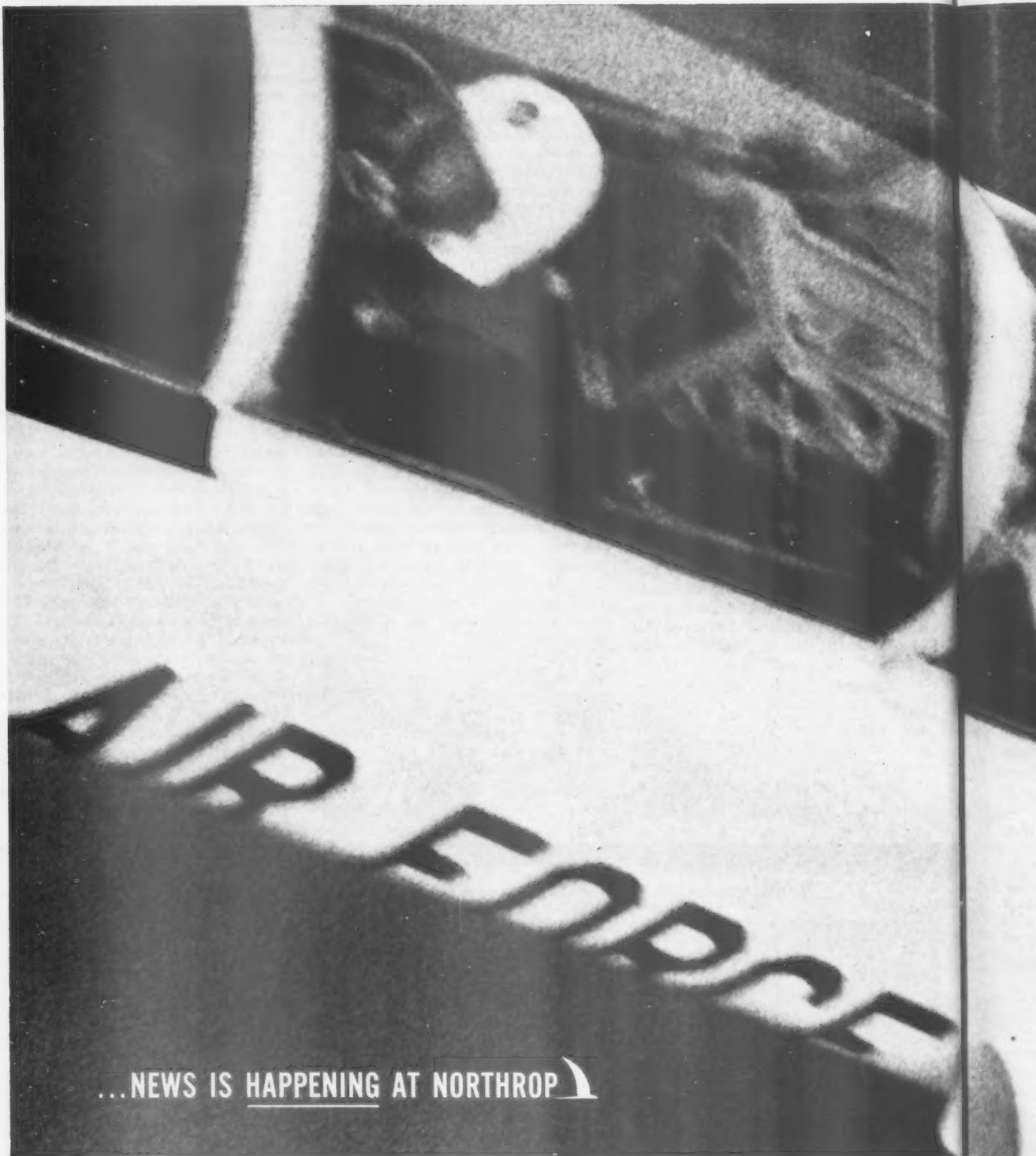
In any event, the NATO air forces are going to have a lot to do with Chateauroux in the years ahead due to the recent creation of a NATO agency for logistics support. Known as the NATO Maintenance Supply Services Agency (NAMSSA) and headed by Major General Charles A. Heim, USAF, the new organization is to provide maximum support at minimum cost to the NATO air forces. The goal: consolidate all their requirements to make possible the purchase of military items in bulk and at lower cost. Furthermore, by finding out just what is on hand in each nation's air force it should be possible to redistribute excesses in one country to another country that might be short. Initially five types of aircraft are involved in the NAMSSA program: the C-47, C-119, F-84, F-86 and T-33. Supply stocks for these five types of aircraft will be maintained at Chateauroux.

AMFEA PERSONNEL PROGRAM
ACTUAL & FORECAST



ANNUAL AMFEA OPERATING COST UNDER PHASE DOWN
MILLION \$





...NEWS IS HAPPENING AT NORTHROP

AIRBORNE! FIRST LOW-COST SPACE AGE AIRCRAFT

USAF-NORTHROP T-38 TALON ANSWERS AIR TRAINING COMMAND
NEED FOR A SAFE, ECONOMICAL TRAINER FOR SPACE AGE AIRMEN



NORTHROP'S T-38 achieves successful initial flight test at Edwards Air Force Base — offers USAF space age airmen supersonic training with twin-jet safety.

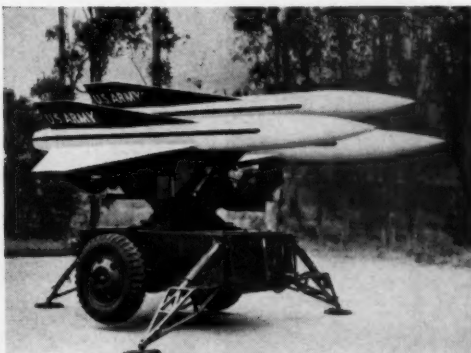


The T-38 pioneers a new Northrop family of lightweight, low-cost manned aircraft. It is a breakthrough reflecting Northrop's constant use of all the tools of scientific management in finding lower-cost solutions to the pressing problems of present and future defense. Latest tool: the Norair-created Performance And Cost Evaluation Program called PACE.

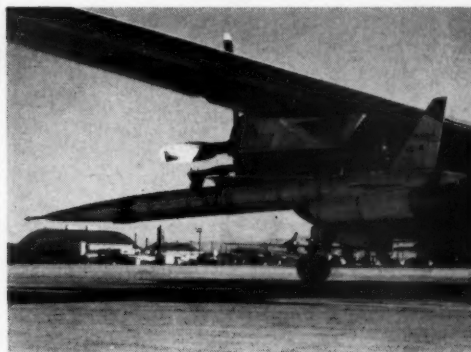
JUNE 1959



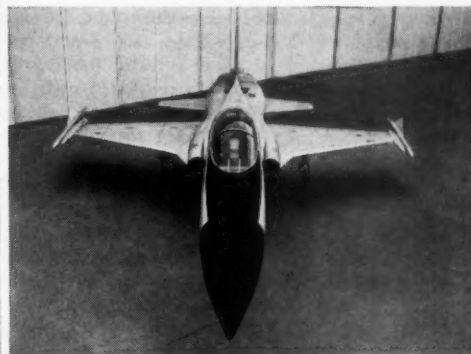
For U.S. Army's Hawk, Nortronics designs, produces airframe and all mechanical ground support as major subcontractor to Raytheon Co.



Latest Radioplane answer to U.S. Armed Forces' drone needs is the supersonic, sophisticated USAF XQ-4 type target drone.



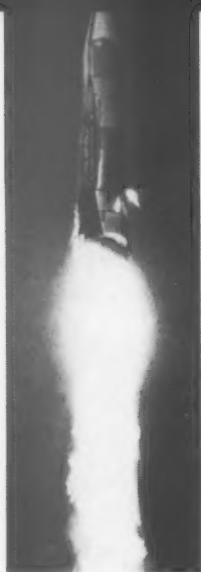
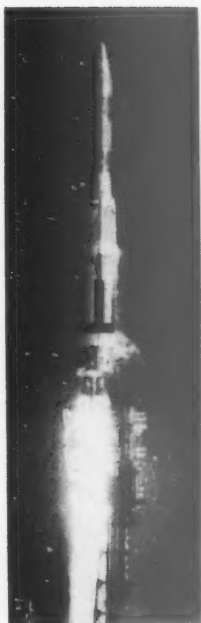
Northrop's N-156F multi-purpose fighter, a high-performance weapon system at minimum cost, now being developed under USAF contract.



**NORTHROP
CORPORATION**

Beverly Hills, California





Ballistic Missiles:

Birthplace of the 1968 Log

*Air weapons have evolved very rapidly since World War II. In the Air Force, missiles—both guided and ballistic—are on the way to becoming a major part of the arsenal. The very newness of the problems that have developed has opened the way to novel and freshly direct logistical solutions.**

BALLISTIC missiles are more dependent upon precise logistics support for their ultimate effectiveness than previous weapons. However, they must be managed effectively within the resources available. Said C. P. Milne, deputy assistant secretary of defense for supply and logistics, recently, "The missiles area presents new problems which may require substantially different logistics concepts from those we have developed through the years. It is conceivable that in developing an effective and economical system for missiles we may be creating the basic rules for the 1968 logistics system."

Although much has been written and published on the development of missile, little has been published on logistics support plans. The ballistic missiles logistic program is being built around a relatively complete weapons system support concept. In no other case has the Air Force gone so far in applying weapon system support management, or made such rapid progress in exploiting electronic data processing equipment and improved communications.

In fiscal year 1955 about 12 percent of Air Force procurement funds were devoted to missiles. By 1960 the Air Force probably will be investing as much in missile systems as in manned aircraft systems.

Logistically, this means the Air Force must be prepared to support two different kinds of weapons simultaneously. On the one hand, it must maintain and continue to streamline logistic support of manned weapons systems. On the other hand, it must develop a logistic sup-

port system tailored like a second skin to the requirements and capabilities of missile. Moreover, this system must be developed simultaneously with the missiles themselves. It must be ready to go, to provide complete support, from the moment each missile type enters the inventory stage.

Optimum mission performance must be built into these missiles, maintained constantly at reliable levels. There is no human operator whose skill, judgment or courage can compensate for malfunctions, once the missile has taken off. The logistical responsibility encompasses a much greater period in the total life of the weapon than is the case with manned aircraft. Maintenance of ballistic missiles, for instance, extends up to the final minute of countdown, when the missile is blasted off on its one-time one-way journey through space. Precision and speed of logistical support become premium requirements as never before.

Also compounding the logistical responsibility is the greatly increased bulk and complexity of ground support equipment required for ballistic missiles. Maintenance of all this support equipment, infinitely complex and greater in bulk than the weapon itself, is a logistical responsibility. It appears that almost 80% of the total maintenance effort will be concentrated upon support of ground equipment.

Said one officer, "A great depth of logistical planning and preparation is necessary to insure our ability to provide this kind of support. The Air Force has been working at it for several years, since some time before integration of the missile units into our forces."

It must be remembered that the ballistic missiles are totally new weapons. There is no operational experience with them to establish precedents, no statistics of usage to work from, other than experimental test results.

Two crucial considerations must be paramount in all planning: first, and of overriding importance, what will

* Information here is derived largely from source material developed jointly by Dr. J. M. Whitsett, an Air Force management consultant; J. M. Smitherman, the ballistic missiles hi-val control officer at San Bernardino (Calif.) Air Materiel Area; and Maynard E. Roof, head of AMC's Spare Parts Study Group.

68 Logistics System?

provide the most effective ready mission support for these weapons; what will best enable them to do the job for which they were created? Second, how can we best balance this against the economic limitation of available defense resources?

Another major task of the past few years has been the realignment of industrial resources for missile production.

American industry in general has played a most responsible role in the engineering and development of missiles. Whole new industrial segments specializing, for instance, in electronics and propulsion have come into being to meet the AF need. Missile requirements, altering the structure of Air Force procurement, have shifted emphasis increasingly to the weapons system approach, a sharper focusing of industrial responsibility for the complete working package.

Most notable perhaps in the creation of the industrial base for missile production has been the development of production and tooling techniques simultaneously with development of test missiles.

In this way, the item tested—once it is accepted—can be manufactured in quantity without fabrication delays. Missile components have been designed from the outset for producibility.

For some time the Air Materiel Command has been phasing and integrating its ballistic missile logistics operations into its depots. Prime assignment for logistical support management (LSM) is presently as follows:

SM-65, ATLAS

SM-68, TITAN—San Bernardino Air Materiel Area

SM-75, THOR

SC-78, JUPITER—Mobile Air Materiel Area

XSM-80, MINUTE MAN—Unassigned

WS-117L, SENTRY—Sacramento Air Materiel Area

As the policies, industrial base, organization and administration of ballistic missile logistics have been moulded,

the Air Materiel Command has also been working to improve Air Force capabilities with the new techniques and tools essential to the speed and precision of ballistic missile support.

The logistic program is being built around a relatively complete weapon system support concept. It employs for the first time an integrated electronic data processing system. In no other case has the Air Force gone so far in applying weapon system support management or made such rapid progress in exploiting electronic data processing equipment and improved communications.

Integrated Electronic Data Processing is being built around the weapon support concept of management. For the first time within AMC, it involves the integration of all functional segments of the logistics program. It capitalizes on the data processing capabilities of electronic equipment. There are three distinct phases:

(1) Integration of the more important segments of logistics associated with "item" management. This includes requirements computations (net by weapons system), cataloging, inventory control and distribution, due-in record system, configuration accounting and transportation scheduling.

(2) Phase two will represent a refinement and extension of original segments and an extension of the total system to include USAF programs, Maintenance, Production Control and Planning, Product Improvement Program, and Budget and Cost, Expense, Appropriation Accounting.

(3) Phase three will involve extending the total system to include the major aspects of "plant" management.

Responsive Commodity Management is being invoked by consolidating the functional areas of supply and maintenance. The ultimate objective would be to combine these functions within an individual.

The magnitude and diversity of commodities and spares involved in supporting ballistic missiles can be seen from the following SM-75 THOR projection.

Sub-system	Organizational Maintenance Spares	Depot Maintenance Spares
Airframe	4,500	17,474
Propulsion	2,000	2,435
Guidance	2,500	3,200
Nose Cone	600	1,100
Lox Generator	1,200	N.A.
TOTAL	10,800	23,211

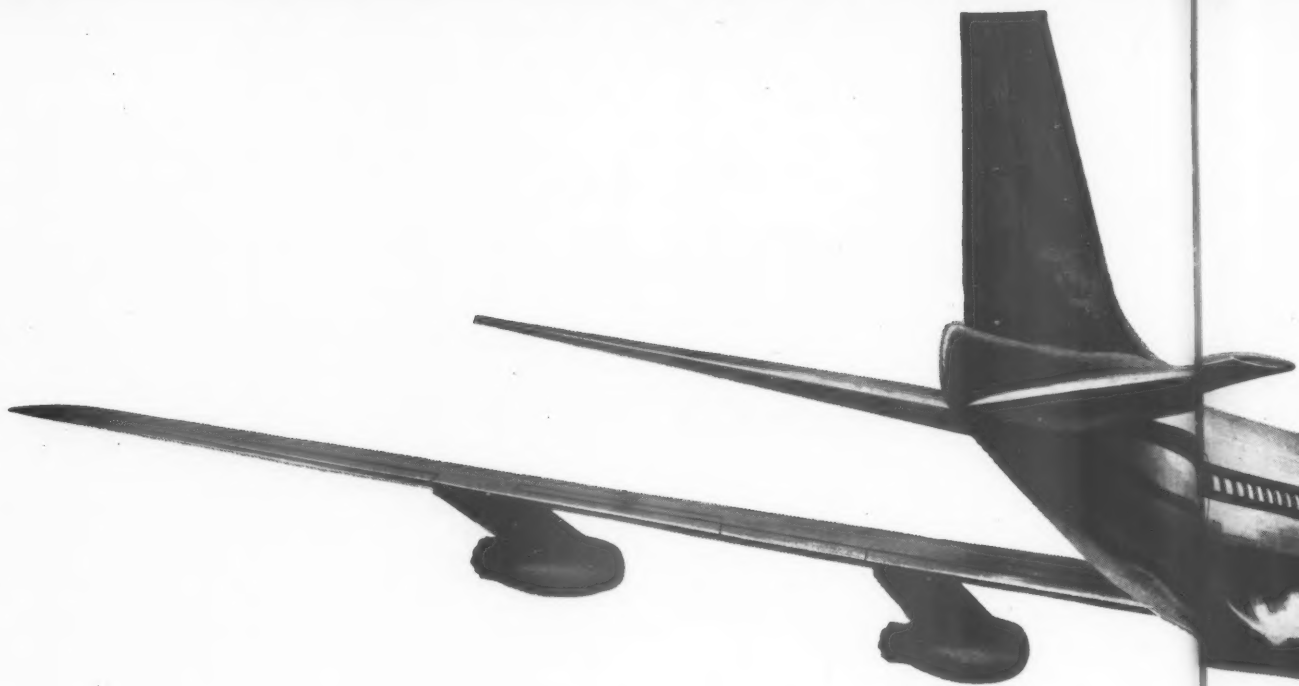
Ground Support Equipment for this family of weapons, has a greater significance than that for previous weapons because successful launching of ballistic missiles is directly dependent on the operational capability of ground support equipment. Items in this category currently represent approximately 33% of the total weapon system cost and 60% of the number of items provided for support. Programs, Requirements and Provisioning for Consumption Type Items.

Provisioning policies for ballistic missile spares conform with the Air Force policy of minimum spares build-up during the period of configuration and program instability.

The basic provisioning policies and concepts related to ballistic missile spares to assure austerity and effectiveness are:

- Single program concept.
- Reduction in procurement cycle.
- Incremental release of phased procurements.
- Essential stocks of missiles spares, by cost category.

A-Single Program Concept—This is an innovation in AMC Programming policy. Under the single program concept, the objective is to procure sufficient spares support against the first production contract to fill initial pipelines and satisfy operational requirements for a limited calendar period. Subsequent procurements are then placed periodically for support of additional quantities of missiles and for stock replenishment. These periodic procurements



NEW HORIZONS IN SOUND RECORDING

Time-identified recording of plane-ground radio communications



Dictaphone, Dictet, Dictabelt, Dictatape, Dictachron and Dictacord are registered trademarks of Dictaphone Corporation, 420 Lexington Avenue, New York 17, N. Y.; 204 Eglinton Avenue E., Toronto, Canada; 17-19 Stratford Place, London W.1, England

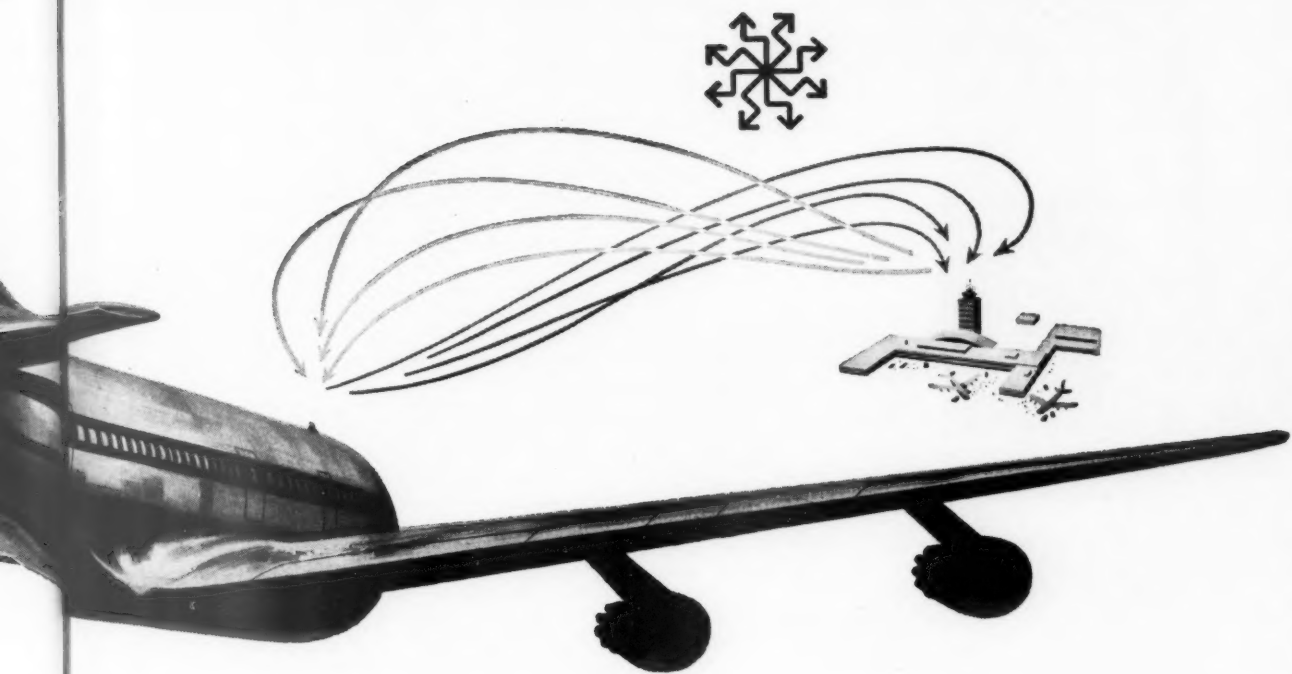
TH
in
Corpo

The
vital a
specia
simul

As
time
time
ing cl
are at



Dict
coro
out
ada



THIS AIR TRAFFIC control problem was another challenge in sound recording and reproducing that Dictaphone Corporation successfully met.

The "when" of a plane-airport communication can be as vital as the "what." To solve it, Dictaphone developed a special model Dictatape machine to record a time channel simultaneously with monitoring channels on *one* tape.

As these channels record aircraft and tower reports, the time channel records audible time signals. To feed these time signals automatically, Dictaphone developed a "talking clock," the Dictachron. Hundreds of these machines are at work 24 hours a day in airports across the country.

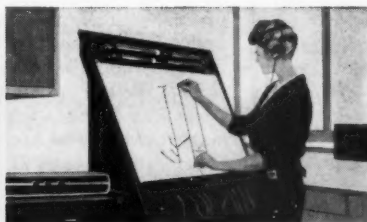
This may surprise many who think of Dictaphone only as the greatest name in office dictation. It is just one example of how Dictaphone Corporation has broadened its base . . . applying advanced research to the growing needs of business, industry and government for recording machines.

Other examples are shown below. Not illustrated are the DICTACORD recorder (using the Dictabelt record) . . . the battery-powered portable DICTET. . . Dictaphone "teaching machines"—a far-reaching development in education.

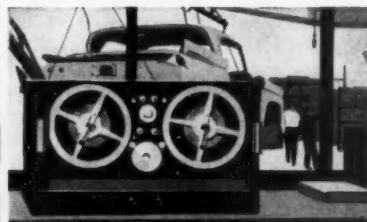
Whenever sound recording instruments are indicated, make Dictaphone Corporation your *headquarters for help*. Recording Machine Division, Bridgeport, Connecticut.



Dictalog—Provides four hours of recording on letter-size magnetic belts without reloading. Dictalogs have been adapted to monitor foreign broadcasts.



AIMO (Audibly Instructed Manufacturing Operations)—Gives job instruction orally. 20% to 100% efficiency increase because worker *hears* each step of job.



Dictachron—Announces exact time automatically! Each minute of a 24-hour day is pre-recorded on tape. Money-saver for industrial timekeeping data.



Dictaphone CORPORATION, Recording Machine Division

Bigger production through better communication for industry

For more facts request No. 122 on reply card.



Successful logistics must be proved in the field.

are placed lead time away from the "need date" as additional facts become available on which to predict future requirements.

B-Reduction in Procurement Cycle—The procurement cycle for ballistic missile support has been reduced from the normal yearly frequency to the following:

Cost Category	Procurement Cycle (in months)
Category I (Hi-Valu)	3
Category II	6
Category III (Lo-Valu)	12

The frequency with which ballistic missile spares support is computed and procurement action initiated is influenced primarily by the extremely fluid state of item design. A failure and consumption reporting system has been established during the Research and Development phase to provide data for guidance in the adjustment of usage factors, procurement realignment and to support an aggressive product improvement program.

C-Incremental Release of Phased Procurements—One of the most crucial periods for effectively projecting spares requirements for new items is during the development, production and early operational phases. This is a period of extremely fluid item design when the demand pattern (service life) is the most difficult to predict. Much has been written on techniques developed to minimize the impact of obsolescence and excesses resulting from procurements during this period. In the ballistic missile program, due to the time compression from research and development to production of an operational vehicle, the problem becomes even more acute. Therefore, to maintain the degree of effectiveness that has been achieved in other commodities within the Air Force, it is necessary to exercise even more stringent control over the initial procurement releases. This is accomplished by releasing for actual manufacture only portions of the total anticipated future requirements. This process of firming up procured quantities on a periodic basis is called "incremental release."

As time goes on, additional increments of spares are released to production on the basis of usage data accumulated and evaluated for a more effective buy. The incremental release practice for ballistic missiles is distinguished from other Air Force commodities in that releases of Hi-Valu items are made at more frequent intervals, i.e., every three months. Each new release covers the additional spares that will be required for a three-month period, lead time ahead of the need date. This systematic and progressive release method insures maximum protection from changes in design, factor, programs and the like, while maintaining the capability to provide adequate logistics support.

D-Essential Stocks of Missile Spares, by Cost Category

—Spares Stockage objectives—and various levels within the total objectives—are tailored to achieve the minimum number of actions to replenish stocks consistent with economy of operations and adequate and timely support. Stock levels are lower than for most other commodities—favorable influences here being the relatively limited and stable deployment of ballistic missiles and ability to react promptly to customer demands. Minimum stockage objectives have been established with the "slow build-up" policy for acquiring spares inventories as a primary consideration.

Stock levels designed to provide "instant readiness" are established for operating squadrons; back-up stocks are established for automatic resupply from storage depots. Policies governing the various levels follow the philosophy of selective management—levels for Hi-Valu items, for instance, being lower and subject to more frequent resupply and tighter control than are Lo-Valu items whose levels are higher, re-supply less frequent, and distribution performed on more of a gross basis.

The addition of ballistic missiles to the Air Force inventory has generated some new operational concepts and has placed considerably more emphasis on others. The Ballistic Missiles Logistics Program has been tailored to support these operational concepts. A basic difference between the ballistic missiles and other weapon systems logistics is the compression of the time ingredient to a greater degree than has ever before been necessary.

The inherent characteristics of missiles and the concepts of modern warfare have brought about an unprecedented need for self-sufficiency and responsiveness at the lowest operational level possible.

The maximum operational capability of ballistic missiles depends on actions in three interrelated areas:

- (1) *Design and Reliability*—This area is the prime responsibility of Air Research and Development Command and contractor.
- (2) *Operations*—This is primarily a using command responsibility.
- (3) *Logistics*—This is basically an AMC responsibility.

Logistics must be tailored to adequately support the operational concepts of the weapon systems. To do this, the design, reliability, operational techniques, and operational concepts must be considered prior to the selection of each type and quantity of spares and ground support equipment. After this selection, the equipment and spares must be earmarked for or pre-positioned at the maintenance facility (organization or depot) where they can be most effectively utilized. The final step for adequate logistics is to insure that the facilities (maintenance and storage structure), technical data, and manpower (quantities and skills) are compatible with the spares, the equipment and the operational concepts.

The Ballistic Missiles Logistics Program illustrates the streamlining and adaptation of Air Force Logistics to the major advances in weapons. The program is built around a relatively complete weapon systems support concept. The general objective of weapon support management is to provide a single point or agency to whom Air Force using commands can refer all logistics support matters for a given air vehicle. It thus encompasses all functions and processes directly related to support—programming, initial provisioning, item identification, requirements, inventory management, transportation, cataloging, distribution and redistribution of stocks.

In working out this program, the Air Force has not been limited by precedents of existing organizations, physical facilities, techniques or procedures when there is a better way. However, the pattern of past developments has fitted nicely into the basic solutions.



This man will fly 2,580 miles in 6½ hours and save the Government \$15.01!

COMPARE THESE AIR-RAIL COSTS!

NEW YORK TO SAN FRANCISCO

BY TRAIN: \$164.61*— 77 hrs. 15 mins.

BY AIR: 149.60 — 6 hrs. 30 mins.

*Rail fare includes Pullman and meals.

SAVINGS BY AIR

MONEY: \$15.01 **TIME:** 70 hrs. 45 mins.

Millions of military dollars are wasted yearly on per diem allowances, pay dollars, overnight accommodations and meals enroute when personnel are moved by slow surface travel.

Always ask "How much by Air"... 10% discount allowed for official travel on TR's. You'll discover that air travel by the Scheduled Airlines can save the military valuable time, money and manpower.

THE CERTIFICATED

Scheduled Airlines

OF THE U. S. A.



ALLEGHENY AIRLINES
AMERICAN AIRLINES
BONANZA AIR LINES
BRANIFF AIRWAYS
CAPITAL AIRLINES
CENTRAL AIRLINES

CONTINENTAL AIR LINES
DELTA AIR LINES
EASTERN AIR LINES
FRONTIER AIRLINES
LAKE CENTRAL AIRLINES

LOS ANGELES AIRWAYS
MOHAWK AIRLINES
NATIONAL AIRLINES
NEW YORK AIRWAYS
NORTH CENTRAL AIRLINES

NORTHEAST AIRLINES
NORTHWEST ORIENT AIRLINES
OZARK AIR LINES
PACIFIC AIR LINES
PIEDMONT AIRLINES

SOUTHERN AIRWAYS
TRANS-TEXAS AIRWAYS
TRANS WORLD AIRLINES
UNITED AIR LINES
WEST COAST AIRLINES
WESTERN AIR LINES

JUNE 1959

27

EDP Solves a Problem at AMC

Having all the information at the right place at the right time is essential to getting the job done in the most efficient way. This is how Air Materiel Command is using EDPS to smoothe the air vehicle modification and supply job.

ALTHOUGH much has been said about the Intercontinental Ballistic Missile and future push-button warfare, the cold fact remains that manned aircraft will for a long time continue to be our principal means of global air defense and retaliation.

This circumstance is graphically reflected in current Air Force logistical system operations which place ever more emphasis on efficiently maintaining a battle-ready fleet of manned aircraft while at the same time carrying out equally important work with the so-called "ultimate weapons"—guided and ballistic missiles.

An example of this is a new electronic data-processing program being developed for command-wide application by the Air Materiel Command's Oklahoma City Air Materiel Area (OCAMA), its Sacramento Air Materiel Area (SMAMA), in California, and San Antonio Air Materiel Area (SAAMA), Texas, which covers a continual, up-to-the-minute determination of the exact configuration status of every air vehicle in the Air Force inventory.

Specifically, the program aims to improve supply responsiveness and efficiency; to reduce required resources; to improve economical procurement; and to gain accurate realistic budgets.

Basic aircraft configuration, engines, and installed equipment are an ever-changing picture. Each component (and there are thousands) is re-designed, improved, or simplified to reflect latest engineering developments and techniques.

Knowing this status, especially for combat aircraft, is in many ways important. But probably exact knowledge is most vital to the combat Commander who must select aircraft for given missions not just on general type, but on certain characteristics present in only some aircraft.

Until the new electronic data-processing program was started, Air Force personnel had to rely on knowledge of what an air vehicle system was when delivered by the manufacturer, or what it should be according to modification directives.

Complete basic information was

available, but unduly dispersed. Manufacturer's files, logistic support documents, and provisioning and procurement documents showed what the air vehicle was when delivered, while other necessary records were available from contractors, depots, organizational files, aircraft records, and Technical Orders.

The new electronic data-processing application will bring together these records and will speedily and accurately produce reports for both logistical and combat managers.

With large-scale computers available at both OCAMA, SMAMA, and other AMA's, this information can be processed into comprehensive reports in hours. Formerly it would have taken days, months, or even a year to collect the information by aircraft or missile serial number. It is obvious that the data would be obsolete before it was compiled.

How the Job is Done

AIMACO, developed jointly by AMC and Remington Rand, is a written computer programming system. Requirements stated with English verbs are fed to one computer which converts the instructions into the codes required by all other AMC system computers.

A saving in programming time up to 30 to 1 is accomplished, and AMC managers are given a simpler, more understandable means of communicating with the Command's data-processing system.

Air vehicle configuration determines logistical support requirements which AMC must fill. Numbers and types of components that must be maintained, overhauled, and modified directly determine the facilities which are needed to do the work. These facilities include those provided by the USAF and by civilian contractors.

Air vehicle configuration also affects manpower requirements, the parts and materiel needed and finally, proper maintenance and modification of components and equipment.

It is possible to extract many types of reports from the OCAMA-SMAMA-

SAAMA electronic data-processing program as it is planned. All master records, programs, and output products are designed to assist the maintenance technician in his job. They may also be used by procurement officers who wish to keep informed.

Technical Orders, are issued for modifications on aircraft, missiles, or engines in the Air Force inventory, and their installed and supporting equipment. When design changes on in-service equipment are ordered, they are issued as TO's. The TO's and supplements are supplied to all organizations that need them. Operational USAF establishments must then see that the modifications are speedily carried out.

Until the new program began, the Air Materiel Area concerned had no information on accomplishment of Technical Orders on individual aircraft, until the individual aircraft was received for modification or maintenance.

Under those circumstances only one course of action was possible. This was to prepare a work order containing all TO's applicable, even though some had already been completed.

The depot or contractor then would inspect the aircraft. Not until then would they know which work requirements remained. Contractors, of course, charged for this inspection.

Now, with a much more efficient field reporting system, plus the availability of all information needed for an up-to-the-minute picture of configuration status, a work specification can be prepared electronically containing only work which remains to be done.

Benefits of this program include:

1) Precise and timely information is available on the modernization/maintenance job confronting the Air Materiel Areas. Overhaul facilities needed and the workload and parts required can be accurately determined.

2) Time needed to negotiate modification contracts can be shortened. Since a firm basis exists for informing the contractor of work requirements and he can be given data printouts in any format he needs, less effort is required for contract cost estimates. Work specifications can be amended as late as a month before the aircraft is due at the overhaul facility.

3) A knowledge of the exact modification and an estimate of time needed

(Continued on Page 46)

For a wide range of applications in—

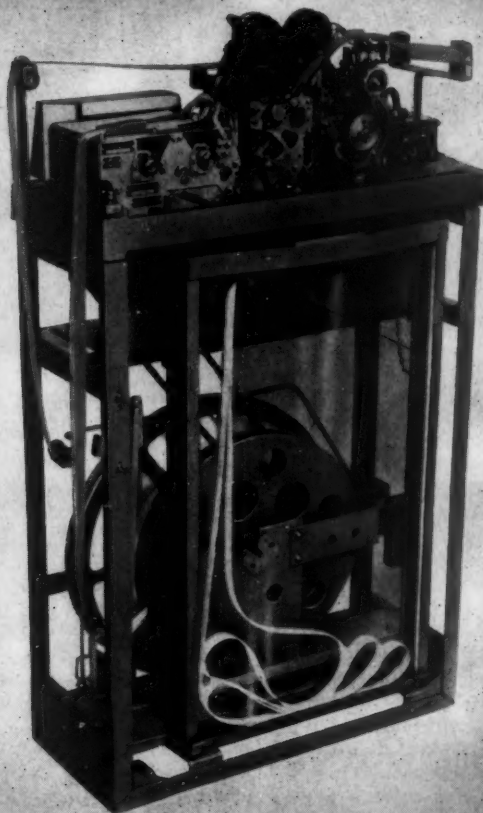
Communications

**Data
Processing**

Automation



Model 28 RT Sets may be mounted in pairs in this newly designed Teletype Universal Cabinet, ideal for office or communications center installation.



New Teletype Model 28 RT Set

The Teletype Model 28 Reperforator Transmitter-Distributor Set features three automatic data handling facilities in one unit. It combines: (1) a typing or non-typing TAPE PUNCH . . . with (2) a TAPE READER . . . plus (3) intermediate TAPE STORAGE facilities.

This new equipment will accept signals at line speed, convert them into perforations in paper tape, and re-transmit the data at the same or another speed.

The Model 28 RT Set is adaptable to a wide range of applications in—

Communications. For high speed, cross-office relaying of messages through automatic switching centers . . . for automatic linkage between communications lines operating at different speeds . . .

Data Processing. For automatic linkage between business machines and communication lines . . . for automatic accumulation of data from IDP systems . . .

Automation. For automatic linkage between incoming control data and signal-operated factory equipment

. . . for automatic relaying of telemetered data over communication lines.

Speeds from 368 to 1,200 characters per minute are available for 5-level code. A manual gearshift permits selection of 368, 460 or 600 operations per minute with either typing or non-typing tape punches. Units with non-typing tape punches operate at 1,200 operations per minute with a fixed gear arrangement.

If you would like more information about this new and versatile Teletype unit, please write for descriptive literature to: Teletype Corporation, Dept. 72F, 4100 Fullerton Ave., Chicago 39, Illinois.

TELETYPE[®] CORPORATION

SUBSIDIARY OF *Western Electric Company, Inc.*

MR. J. K. Stonewall's letter, "Civil Service: The Management Bogeymen," appearing in the February ARMED FORCES MANAGEMENT warrants serious consideration. He has courageously risen to challenge a tremendously vital issue. It is a bit unfortunate, however, that he has loosed an indiscriminate broadside which may do more to confuse the issue than to clarify it.

An informed reader will surely agree there is an element of truth in most of Mr. Stonewall's statements. But while alluding to many known problem areas, his major thrust seems to be at an element of human nature—a "me-first, damn-the-economy" attitude which he rather generously applies to the typical federal employee. But whether this is the philosophy of the "great majority" of Civil Servants, as Mr. Stonewall asserts; or whether this philosophy, however prevalent, is attributable to the "Civil Service System," are questions which cannot be answered categorically.

And since arguments on such questions usually produce more heat than light, I shall not attempt to shoot down Mr. Stonewall's position. Rather, I would like to narrow it to a more specific target. "Civil Service" is a pretty big adversary; and I doubt if even Mr. Stonewall sincerely believes that the entire system is bad. I believe, however, that there is one element of that system which he seems to have overlooked, but which may well provide the basis for much of his complaint.

Unfortunately, the weakness of this element is not only that it permits, or even that it encourages manipulation at the sacrifice of economy. It does both, but it does more. It fosters stagnation, and too often it makes "economy" cost more than it saves. This roadblock is the system of "position classification"—the method used to implement "equal pay for equal work" policies in the federal service.

In reality, this has little to do with popular concepts of the Civil Service System as a cure for political patronage, when the issue is between "merit" and "spoils" in hiring and firing. Position Classification in the federal service is rather a device for grading work and fixing pay. And this is done without specific reference to the employee involved, the nature of his appointment, or the quality of his work.

Why is this system so detrimental to economy? Because it is fundamentally and irrevocably based upon the "status quo" concept. Under the system, the "position" is the ultimate sub-division of work in an organization. It represents a specified aggregate of duties charged to one employee.

How to Stop Civil Service Empire Building

A broadside blast at a system is only good insofar as it can be narrowed down to working limits. In this sequel to our March reader's comment (Civil Service: The management Bogeyman), the blast of the "Atlas missile" is replaced with a surgeon's scalpel.

These duties, matched against "standards," determine the grade and pay for the employee. Once this has been set, there can be no change in grade and only nominal change in pay (periodic "step increases") so long as the employee remains in the position and the duties do not change. This is "status quo."

This has two distinct implications regarding economy. But before we examine these, let's remember that efficiency or inefficiency is, in the final analysis, a function of people. We must examine how people—federal employees—look at the "status quo" established by official position descriptions. It can readily be seen that in some situations it would be desirable to change the status quo, while in others it would be desirable to preserve it. This is totally without reference to the question of economy.

First, let us look at a normal, capable and conscientious Federal employee (if Mr. Stonewall will grant us one for the sake of the discussion). Let us presume that he holds the highly respected desire to improve himself and his position in life. What can he do to fulfill this desire? If he keeps his nose clean, each 12 or 18 months he will get a little more money up to the limit of his grade. But this takes a long time, and probably fails to satisfy him. Next, he can anticipate the day when a "higher-up" will retire. If this looks too remote, he can do what most ambitious civil servants do sooner or later—scout around for a higher position elsewhere.

But suppose he likes his work, and his boss, and his office. Suppose his boss likes him too, and would hate to lose his experience and ability. So, the subject of a "promotion" comes

up. There is much talk about a position description, and a trip to the personnel office. Here the boss says, "How about a GS-12 for Joe?" Then comes the inevitable question, "How have the duties changed?" "Well," admits the boss, "they actually haven't, but Joe is doing a bang-up job, and I'm about to lose him." Then, with the total finality possible only with the full backing of "the system," the personnel officer sadly announces, "I'm sorry, Sir, in that case the position is properly classified at GS-11."

So what happens? This depends on how much the boss wants to keep Joe, and how ingenious he is. Give him a plus on both counts, and he is apt to go back and see about changing those duties around a bit. Maybe he can set up a new unit with Joe in charge. Maybe this isn't necessary for "efficient operations"—maybe it is a bit clumsy—and of course it will cost more somewhere along the line. But he keeps Joe, and he gets the job done without interruption. "The system" often forces this kind of a choice: shall we have an efficient organization and an inadequate staff; or shall we have an adequate staff and an inefficient organization? (It is people—not organizations and system—who do the work).

Now let's look at the other side of the coin. Despite Mr. Stonewall's dark portrayal of the federal service, there is an interest in efficiency and economy at some time in every organization. This may stem from various sources—a drop in program activity, discovery of duplication, an employee suggestion, a budget cut, and so on. What happens? All too frequently nothing does, and usually for a good reason. For in the final analysis, better efficiency and more economy simply

mean that something now in existence must go. And when we find it, the thing which ought to go is going to be the backbone of somebody's position description—a fundamental element in his "status quo." Take this away, and we jeopardize his grade, his pay, and probably his tenure of employment.

When somebody threatens a man's pay or continued employment, there is apt to be trouble. We can have all kinds of fair and equitable retention and bumping procedures, but they aren't worth a dime to the man who gets bumped. In the highest ethical sense, we can say that neither he, nor his boss, nor his organization have any right to stand in the way of economy because of a selfish desire to make a living. But I have myself been through the "RIF" wringer, and I have known dozens of others who have agonized through the attendant downgradings, bumpings, and ultimate separations. And I say in all sincerity that it is hard for me to get steamed up about efficiency and economy when I know the "savings" are coming out of my pay check. Nor is it too surprising to find that even the best administrators feel that potential savings from an economy measure are not worth the costs of dislocated work force.

So there it is. The "status quo" which is the inevitable product of our position classification pay system is basically opposed to economical operations. It fosters change towards inefficiency; it resists change towards economy. If anything can be done about it, it will take a lot of doing. The most obvious approach lies in severing, or at least modifying, the iron-clad bond between grade-of-position and pay-of-incumbent.

This relationship was established to insure "equal pay for equal work." But as a policy, this has already been punched full of holes. Witness the many blue collar employees whose salaries are determined by prevailing wage rates. Also the current provision for top-of-grade salary rates in critical categories, and recent legislation for salary retention in certain instances of job down-grading. If, then, this policy is neither sacrosanct or immutable, the method by which the policy is generally implemented can well stand re-examination.

Space does not permit discussion of the pros and cons of this, or of any other course of action to alleviate the situation. My desire is simply to point out a promising area of investigation. If we really want efficiency and economy, this may be a good place to start.

G. D. THOMAS

Administrative Office
Department of the Navy

JUNE 1959

Talk to any military group on a minute's notice with the **NEW** RCA 'LECTRONIC LECTERN



GET YOUR IDEAS ACROSS FORCEFULLY

...audience hears
every word

Speak from an RCA 'Lectronic Lectern and you know you'll command attention in the farthest corner of the room. Get personnel together in any space that's available. Your completely portable 'Lectronic Lectern can go right along with you. Its powerful, all-transistor amplifier, built right into the system, operates from any 110-volt A.C. outlet, or batteries. Transistors mean instant operation and long life.



Tmk(s) ®

RADIO CORPORATION OF AMERICA

LECTERN SALES
CAMDEN 2, NEW JERSEY

**MAIL
COUPON
TODAY!**

Radio Corporation of America
Dept. U-299
Camden 2, N. J.

Please send details on the 'Lectronic Lectern

NAME _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

**Built-in
High Fidelity
Sound System**

Transistorized!

Operates from any
110-volt A.C. outlet,
or from batteries.

Complete with
miniature
broadcast quality
TV Microphone

Mounts on lectern or
suspends around neck.

**Serves audiences
up to 600**

Projects your voice to
the last row.

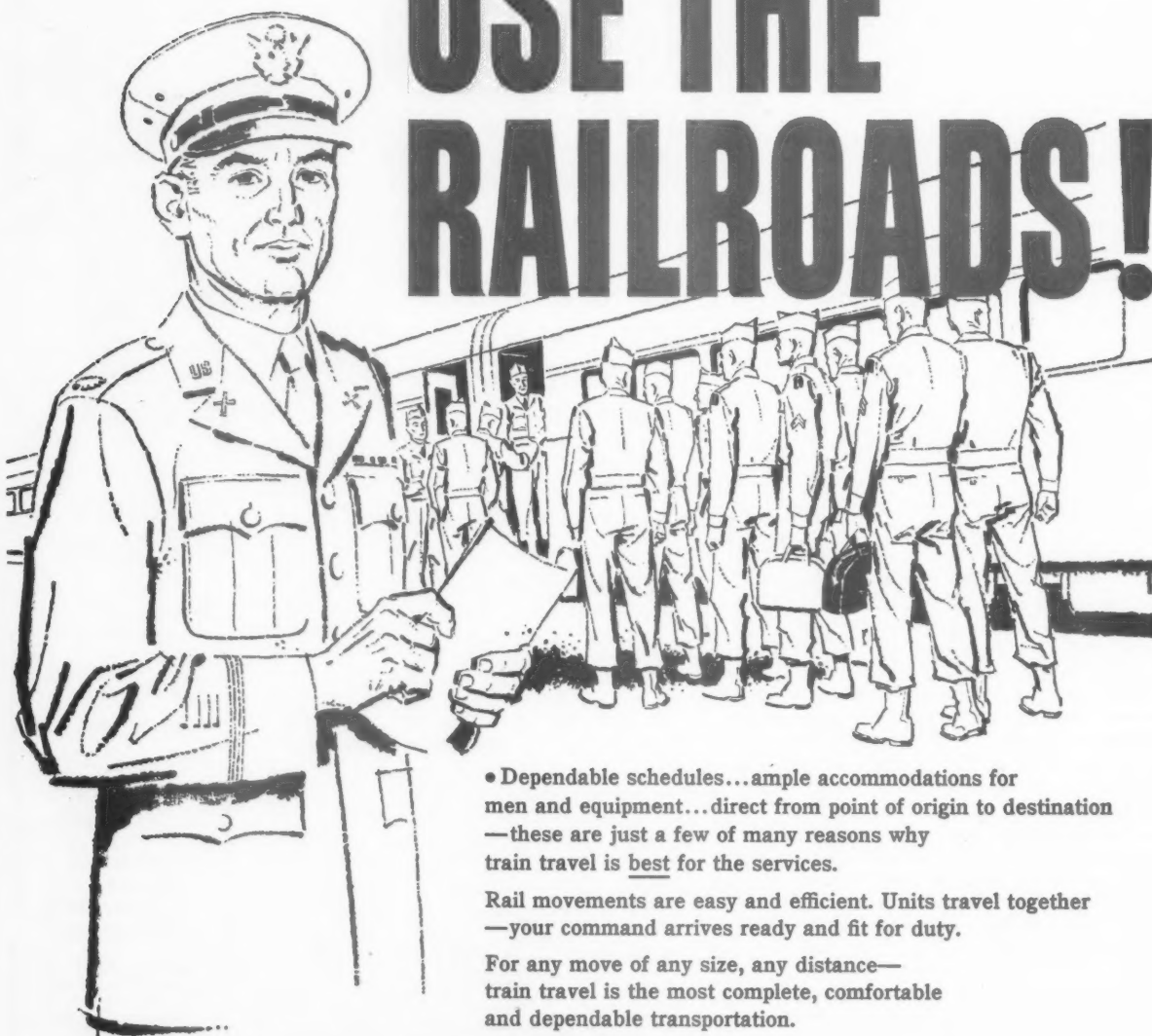


**Portable!
Sets up in
30 Seconds**

Just open it up,
plug it in, and
start talking.

For more facts request No. 106 on reply card.

TO BE SURE... USE THE RAILROADS!



• Dependable schedules...ample accommodations for men and equipment...direct from point of origin to destination —these are just a few of many reasons why train travel is best for the services.

Rail movements are easy and efficient. Units travel together —your command arrives ready and fit for duty.

For any move of any size, any distance — train travel is the most complete, comfortable and dependable transportation.

the RAILROADS OF THE UNITED STATES
*Reduced fares when on leave
...special discounts on Transportation Requests
Ask about Family Fares*
The Best Buy — BUY TRAIN!



Navy's New Research Office

THERE has never been much doubt that the Navy's new office, Deputy Chief of Naval Operations/Development, was going to be set up. Not only is it a natural result of the evolution of things, but the paperwork was already well down the road even before Navy's Committee on Organization had recommended (last month) that it be created. Chief of Naval Operations Arleigh Burke had picked his first DCNO/Development (Vice Admiral J. T. Hayward) as early as mid-April.

Hayward's staff has already come up with a tentative organizational structure (see above) which has verbal front office approval. It follows closely the Committee recommendation that the office be set up on a weapons systems basis. To staff the shop, Hayward is requesting a complement of 247 officers, 103 civilians expects for a number of reasons (some of them

noted below) that actual working personnel total will reach only about half that 350-man* crew—at least for some time to come.

Spearheaded by Capt. W. H. Groverman, the DCNO/Development office is trying to consolidate, at the moment, the readily available Navy elements ordered pulled under its wing. But there is a problem on the horizon. Boiled down, it amounts essentially to billets—putting names

**As much as anything else, his office used the size of similar Army and Air Force offices as a guide. Actual comparison: Army's Office/Chief of Research and Development, including an Army Research Office total of 85, is authorized 301 officer, civilian and enlisted personnel, currently has 271 on duty. Air Force Office/Deputy Chief of Staff, Development is authorized 300, actually has 270 on duty.*

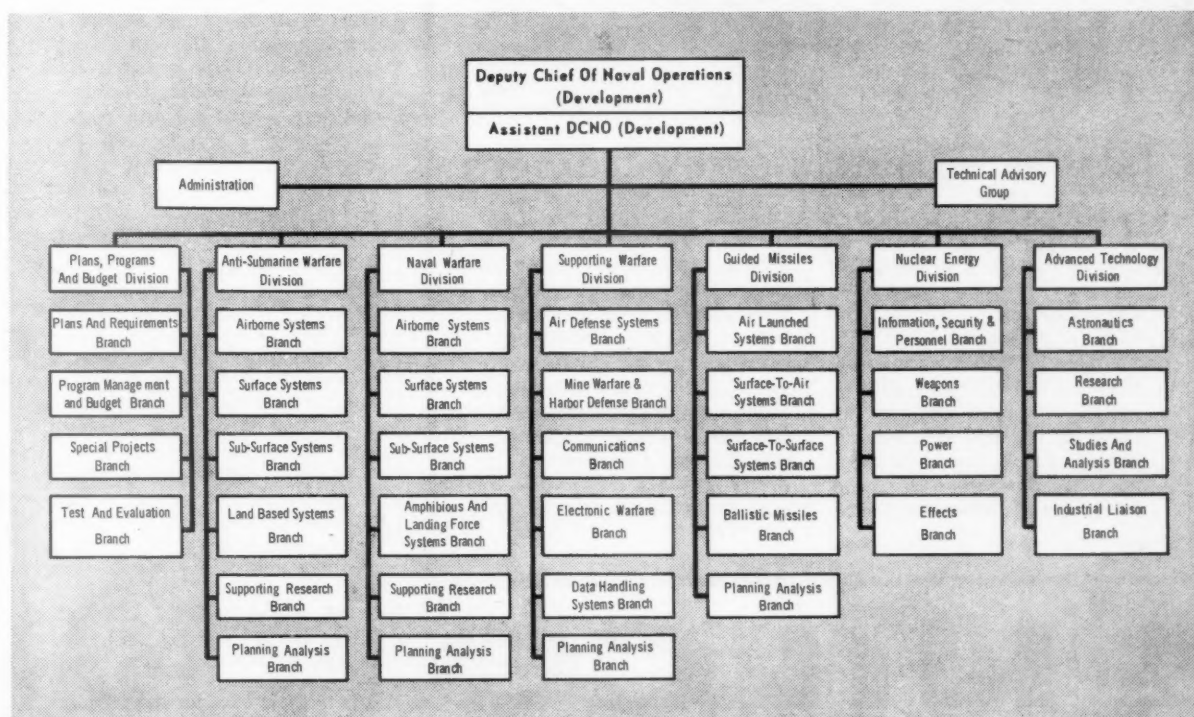
into the organization-chart boxes.

There are enough men around with the talent to do the job but the Navy's billet ceiling, set by the Secretary of Defense, is not high enough to accommodate all DCNO/Development wants and still keep the rest of Navy's Washington billet structure intact.

This leaves Burke one of three choices: (1) Move some of the present Washington jobs into the field to make room; (2) Transfer some billets from other Navy Washington offices into DCNO/Development; (3) Request, through the Navy Secretary, that Defense Secretary McElroy raise the billet ceiling.

Depending on how fast he wants to push Development into full-scale operation, Burke may be forced into choice number three but, for now, he does not intend to make such a request. For a number of reasons this seems a wise move. "If nothing else,"

The Alignment Navy Wants



said one man, "he'll discourage empire building." Thus, staffing DCNO/Development will probably come from a combination of the first two choices.

Fully staffed operation may take as long as a year, possibly even more to complete. In one respect, this should be a benefit. Said one captain: "This job hasn't been done by us in the past. We don't know how much it will really take. It's a big, uncharted change just to start."

Gradual build-up means refinements can be pumped into the operation as it develops, keep the organization flexible—a prime requirement in today's R&D environment—and billet trans-

fers will be less of an up-rooting revolution. Conceptual errors, major and minor, can be straightened out when it's easiest, before the organization has hardened.

On the dark side: big chunks of Hayward's organization by weapons systems will take time to develop—and time is something impressively precious to Navy R&D, particularly with a bureau merger going on at the same time. In fact, the strongest segments of DCNO/Development right now are not weapons systems offices at all. Examples: the Guided Missiles division and Nuclear Energy division, following the Franke Committee's con-

cept, make as much sense as organizing one division for 16-inch guns, another for 8-inch, etc.

(Because the same types of offices exists in SecDef, the other services, the Atomic Energy Commission, Hayward needs these two teams to handle Navy's R&D problems in their fields, provide a point of contact for other like organizations elsewhere. Eventually it is planned—and Army, Air Force and SecDef feel a similar way about their groups—that these two offices will be assimilated into the "weapons systems" divisions, i.e. Anti-submarine Warfare, Naval Warfare and Supporting Warfare.)

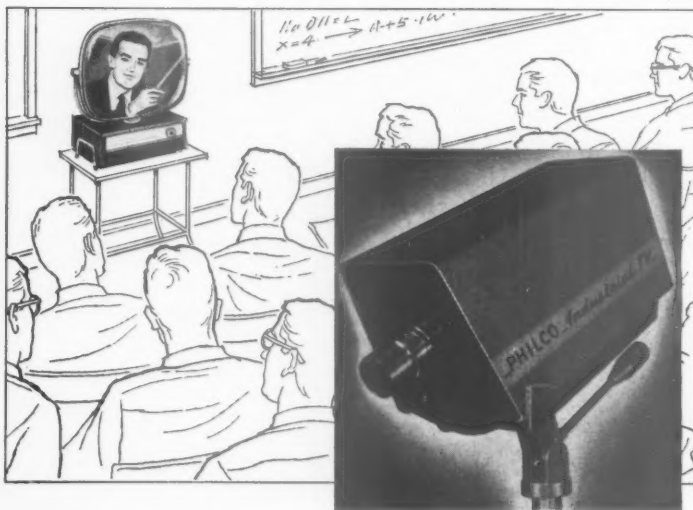
For the time being, however, they are virtually unaltered transfers from other spots on the Navy organization chart, have relatively minor problems in maintaining momentum through the changeover. Nuclear Energy division, for instance, was formerly the Atomic Energy division in CNO, will still be headed by Rear Admiral F. L. Ashworth. Although Rear Adm. K. S. Masterson's primary job will be as Hayward's Assistant DCNO/Development, he will still monitor the Guided Missiles shop, for the time being, which he brought with him in the transfer.

Paperwork is not yet finished but the Technical Advisory Group (once an Office of Naval Research outfit) has, for all practical purposes, already shifted into Hayward's custody, is being headed by Dr. R. O. Burns, formerly ONR development coordinator. Plans, Programs and Budget division and the Administration office are, essentially, Hayward's one-time Assistant - CNO - for - research - and - development staff with, generally, new job titles.

For the rest: Advanced Technology division (the long range planners) will definitely be a staffing job of tomorrow, not today, probably pull its personnel nucleus from the Technical Advisory group. The "weapons systems" divisions' growth is the immediate problem. A handful of officers have trickled in, the latest four from CNO's ASW Readiness office. More skeleton crews will be coming, possibly even from Hayward's PP&B division, itself. For now, ASW, Surface and Support divisions will be segments of the PP&B setup until there are enough bodies to launch them on their own.

One sure outcome of all this: conscientious officer Hayward, with the help of his old staff, will still be carrying an almost-as-large share of the Navy's R&D planning, progress and decision-making load on his own solitary shoulders as he has been—for quite a while yet.

First from PHILCO®...



New All-Transistor TV Camera for Schools at only \$1445

Here's the camera that makes educational TV practical—dependable and trouble free... at a saving of hundreds of dollars.

A lightweight, maintenance-free, foolproof camera that anyone can operate. No matter how large the audience... now, everyone can participate in lectures, demonstrations, classroom sessions. Compare the quality of this newest Philco

TV camera with any other. To improve the quality of your audiovisual program... at dramatic savings... insist upon Philco TV.

Place your order now to assure early delivery. Write for Philco TV Planning Book. *Government & Industrial Division, 4702 Wissabickon Ave., Philadelphia 44, Pennsylvania. In Canada: Philco Corporation of Canada Limited, Don Mills, Ontario.*

PHILCO

QUALITY FIRST!

For more facts request No. 102 on reply card.

Engineering Services: Buy or Build?

The 50-year-old engineering services industry, still a suspect field to much of the military and big business, shows signs of growing up. If they succeed, the potential saving in time and money on military development projects is tremendous. But there are pitfalls . . .

YOUNG but never more prosperous, the engineering service industry is fighting for respectability. But youth and the lure of possible high profits lately have attracted a great many fly-by-night outfits whose suspect practices have hurt the entire business. The result: military research offices and prime contractors have spent tremendous amounts of money building an in-shop design and drafting capability, ignored potentially more efficient and less costly engineering service firms.

There are signs, however, that this may change. A handful of design and drafting companies are pushing for development of a code of ethics, demanding the industry set up some ground rules (in a habitually cut-throat business) for dealing with clients. The reason: a combination of ethical practices and top-level management can make the "custom-fitted engineering task force" sales pitch hard to beat.

Typical of the crusaders is Consultant and Designers, Inc., a small (about 1000 employees) firm with offices sprinkled all over the country. When 42-year-old Charles E. Zimmerman founded C&D 10 years ago, he was warned that mathematically, it was the completely wrong time to go into business. He went ahead anyway. C&D showed a profit after just two months' operation, today has a solid behind-the-scenes reputation with a customer list that reads like a Who's Who of the Defense Department and American industry.

Wanted: A Reputation

C&D's virtual anonymity outside its own clientele is no accident. One big reason top U.S. firms have been soured on engineering service companies in the past is the fear of passing on know-how in subcontracts one week, finding their engineering service supplier us-

ing the know-how to compete against them on prime contracts the next.

Says Charlie Zimmerman, "The most important thing we have to do is build a reputation for integrity. It's just not good business to compete with your clients." His reason: there's more money to be made on both sides of the fence by cooperating than by undercutting. To date, Zimmerman's designers and draftsmen have logged nearly 4 million man-hours on jet, turboprop, STOL-VTOL aircraft, guided missile systems, the ICBM program, helicopters, ships and satellites. Currently, C&D pulls in just under 10% of the money spent on the \$75-million-a-year engineering service industry.

Engineers are Needed

It is pretty well known that the clamor for engineers, designers, and draftsmen is high. A good share of this clamor is caused, directly or indirectly, by the huge military development program. Yet, the very nature of the military market creates prime contractor headaches. Good men demand top dollars mainly because they know they're being hired more for a project than by a company, know too there is little chance for job permanence.

The result: it takes time to build an in-shop organization; in-shop overhead costs average 100-200%—against C&D's approximately 30%. Turnover frequently will run as high as 50-75% after only five weeks (just when the firm can reasonably expect to start breaking even on production). Applied to temporary help, as technical people frequently are today, fringe benefits, severance pay, etc., is expensive.

This should make companies like Charlie Zimmerman's look pretty appealing to military contractors. C&D will put men wherever the client wants, they run all the personnel risks, and

STOP COSTLY RE-DRAFTING OF ORGANIZATION CHARTS

THE COFFIELD EVERLASTING

Interchangeable
**ORGANIZATION and
MANNING
CHART**

EASY TO CHANGE

A typist, a typewriter and typing paper are all you need to keep your chart up to date. It's that simple!

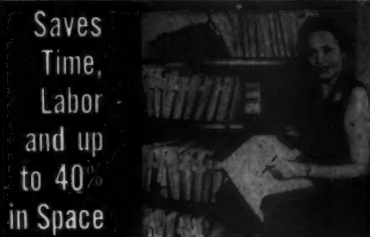


- Sizes to Fit Any Organization Structure
- Photographs for Sharp Prints
- Make Fast Spot Changes
- All Parts Are Movable and Re-usable
- In Government Service Everywhere

Write for Free Illustrated Brochure AF-6 or Consult our GSA Federal Supply Service Contract . . . Group 74—Parts 3 and 2—Item No. 50-63 Cont. No. GSOOS—18238 . . . Code 79.

MANAGEMENT CONTROL CHARTS CO.
1731 N. WELLS ST. CHICAGO 14, ILL.
For more facts request No. 101 on reply card.

THE ANSWER TO YOUR FILING PROBLEMS



CORRES-FILE®

For modern secretaries, Corres-File brings all important papers to her fingertips—as close as her typewriter—making her as fresh at 5 P.M. as at 8:30 A.M. No waste motion — everything's in reach from a seated position.

For the modern secretary and the modern office, install Corres-File and you'll:

- Cut time in half • Save costly labor
- Increase efficiency • Double capacity without sacrificing space

Patented

Creator of Effective Tools for Effective Management

Phone Westport, Conn. CA 7 4111 or write
WASSELL ORGANIZATION, INC.
Westport, Conn.

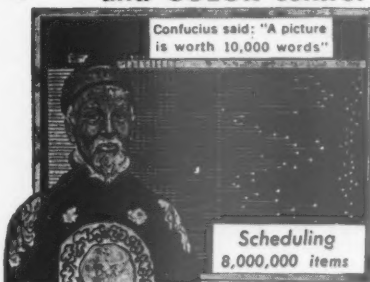
IN USE IN ALL BRANCHES OF GOVERNMENT
WRITE FOR NEW BOOKLET "CORRES-FILE"

Consult our GSA Federal Supply Service Contract
FSC Group 74, Parts 111 & 11,
GSA Contract Number GS-008-16525
(Item Number 50-65)

For more facts request No. 100 on reply card.

PRODUC-TROL Visual Control

not only schedules,
But automatically checks
with TIME, LINE
and COLOR control



- Original cost and upkeep low.
- Schedules and time checks operations.
- Historical record to back it up.
- Bad situations show automatically.
- Its simplicity has put it into world-wide use.
- Analyze 100 items in 10 seconds.

Effective Tools for
Effective Management
WASSELL ORGANIZATION, INC.
Westport, Conn.

For more facts request No. 104 on reply card.

MONTHLY INVESTMENT PLAN

Hamilton Funds is an investment fund holding stocks in over 80 corporations. Plans as low as \$10 monthly.

Hamilton Funds

Dept. H-3

Box 5061, Denver 17, Colo.

Please send me prospectus booklet without obligation.

Name

Address

City

State

For more facts request No. 103 on reply card.

can be dropped off the payroll almost as easily as changing a suit of clothes. (Standard C&D contracts say, in effect, only that, "client will pay C&D 'X' dollars for so many hours' work." Client can cancel contract on extremely short notice—a few hours in some cases.

What it Takes to Succeed

But all engineering service firms are not run like C&D. The business is relatively easy to get into and, because it is, many who are in shouldn't be. Investors, apparently, think the field is plush; there's not much chance of getting hurt. As far as Zimmerman is concerned, they couldn't be more wrong. "To do a good job in this field," says he, "takes a depth of management know-how, comprehensive personnel procedures, and planning of a very high caliber."

Consequently, companies with a solid foundation in the field usually have, also, some of the strongest management teams in the country. The black side of the picture: only about 50 to possibly 100 (out of 2000) engineering service firms qualify as something more than "quick hit" operations.

Even without quick deals, undercutting and personnel raids, the market demands alone make high level top management a prime requirement. C&D is a good example. Flexibility is the key word in client use of C&D manpower and services. Demands for personnel can turn on and off like a light switch. "Everybody hired must be a pro when he walks in the office," says Zimmerman. "We can't take men out of school, haven't time to run a formal training program."

Like the commander of a sort of engineering Marine Corps, Zimmerman must have teams and individuals, all security cleared, available by the day, week, month or year or for the duration of the project and for any size job. Approximately 60% of C&D's staff works in home and field offices, the rest on client's premises.

Obviously, too, the almost incomparably wide base of experience and knowledge his men pick up in covering all sorts of military projects makes them prime targets for client hiring. "Today," says Zimmerman, "design engineers frequently know more about the client's problems than the client himself does. And you can't expect men with that much know-how to live out of a suitcase forever."

In effect, C&D must run what is almost a department store type of engineering service—something for everyone. A highly volatile labor demand coupled with the need for a wide spectrum of talents means C&D must oper-

ate a fluid organization, still build in a high degree of stability—two apparently opposing objectives.

One big C&D asset is its nation-wide branch structure. This asset is more an off-shoot of business success than anything else. C&D has yet to open an office whose prime purpose was to develop a market area. All branches now existent were first established to handle particular task group assignments at the request of a local client. Permanence came later with increased sales.

(Although billing on a subcontract design job can run from \$1,000 to as high as several million, "average" fee is about \$250,000, probably involves services of 30 men for a year.)

In any event, with good engineers drawing around \$250 a week (compared to about \$60 when Charlie Zimmerman went into business for himself) and with all the obstacles to their efficient use, it is fairly obvious that experienced management savvy is a prime requirement for success.



C&D President Zimmerman (right) accepts congratulations from Army Secretary Brucker early this year after receiving an "Outstanding Public Service Award" for his company's contribution to the successful launching of Explorer I.

Engineering service firms are potentially a vital segment of the military prime-subcontract structure. Potentially, they can do a highly superior job at much less cost. Potentially, too, they are a stable, yet mobile, service which can start on a job the day they are hired—rather than several months later after "adjustment" to a new company.

Unfortunately, not enough of them realize, yet, how valuable they could be. Too many are trying to corner a slice of a commodity—engineering talent—and sell it to the highest bidder. Too few are interested in providing a permanent engineering service. The result has been growth in spite of themselves. Says Charlie Zimmerman, "This business is a great deal more complicated than getting a contract and hiring some engineers—if you expect to stay in it very long."

ARMED FORCES MANAGEMENT



Procurement Trends

"A LONG AND CONTINUING PROGRAM" FOR THE MINUTEMAN solid-propelled ICBM is what the Air Force expects, as a result of the anticipated savings on the missile. In spite of smaller-than-Atlas warheads, and the need for brand new facilities for the missile, cost/effectiveness will be much lower than for any present missile system.

AN ORGANIZED APPROACH TO QUALITY CONTROL IS BADLY NEEDED, and being worked on by Air Force missile developers. Need is dictated by drastic changes in quality requirements for missiles, brand new criteria that must be applied. Says one Air Force officer, "We don't even have standard definitions for the terms we use."

ONE AREA WITH NO COMPUTER PROBLEMS IS THE AF MISSILE SUPPORT operation at San Bernardino Air Materiel Area, where the IBM 705 installation is grinding out answers around the clock. According to BMC officers, "We've come about as close to perfection as we can with the human element in the system." For the future, AF is eyeing another 705 for San Bernardino, would like to see smaller computers (IBM 305/350s) in the field, serving to insure clean, accurate data at San Bernardino.

CONTROVERSY PRESENTLY SURROUNDING SALTONSTALL BILL, which recognizes and encourages Weapons System procurement, will be openly aired before the Senate Armed Services Committee. While Saltonstall/DOD differences could have been settled out of court, both parties felt that public airing of the problems would be more worthwhile. Sources in Saltonstall's office feel that a workable compromise will be reached, are more worried about getting House approval for the legislation.

EFFECT OF WEAPONS SYSTEM BUYING IS STATISTICALLY SHOWN by the distribution of defense dollars. During Korean war, the top 100 contractors picked up two-thirds of all the dollars spent. But at the present time, the top 100 are accounting for 75% of the money tied up in defense. With Air Force calling the team concept a "logical outgrowth of weapons system buying," an even greater increase would seem to be implied.

COMMENT ON LIMITED WAR PREPAREDNESS is offered by a quick glance at a breakdown of the Air Force budget. Of a total \$18-plus billion, Tactical Air Command gets roughly six percent, or about \$1-billion. Strategic Air Command, which commands 20% of every defense dollar, will obligate an estimated \$960 million for personnel alone—just under \$40-million less than TAC will have for its whole operation.

A SORT OF "HUMP IN REVERSE" MAY OCCUR WITH AIR FORCE MISSILE PERSONNEL, when more missiles begin to demand more people to man them. In the past, AF has been able to pirate trained technicians from aircraft-type organizations, applying already-existing skills to the missile work. In the future, this source will inevitably dry up, and missile personnel will have to be trained from scratch. As yet, Air Force has no basic courses set up for its missile people.

PROBLEMS IN CONCURRENT DEVELOPMENT OF MISSILES are summed neatly by one top Air Force officer: "It's like running a foot race in reverse. What we have to do is to take all of our runners and try to stagger them at the finish line so that they all get to the start of the race at the same time."

A PAT ON THE BACK FOR THE ARMY—and a tribute to the ability of the services to work together—comes from Air Force's AMC Ballistic Missile Center. Says Deputy BMC Commander Col. John Zoeckler, "We couldn't be more happy than we are with Army's work on our missile bases. If anything, we've learned from them as we've gone along."

Defense Opposes Saltonstall Bill

Defense Department has expressed reservations to S. 500, the highly-touted Saltonstall bill, which would create changes in the present way the Pentagon is doing procurement business. DOD has told the Senate Small Business Procurement Committee that the bill places "undue emphasis" on purchasing weapons systems from a single contractor.

Defense has recommended revision of that part of the bill which gives statutory recognition to the weapons system concept. Explaining the DOD position, Assistant Defense Secretary Perkins McGuire said the present language "fails of this objective because it places undue emphasis on a single management within a department and on the procurement of an entire system from a single contractor."

Existing language, he said, would "foreclose small business participation as prime contractors in weapons system procurement." Further, he said, "No single method or formula provides the answer to the management on procurement of weapons systems." The opposition to the bill arose in spite of feeling that the bill would go smoothly because it had been drawn up with the cooperation of Defense Department.

Dual Weapons Check Criticised by McNeil

Pentagon Comptroller W. J. McNeil has told Congress that an additional review of Defense weapons programming by the Senate Armed Services Committee would only serve to slow down appropriations, and would probably hamper reprogramming of funds. Space, foreign aid, and military construction funds are now handled in this way.

McNeil said that DOD would cooperate if such a system were formed, but said that an added set of hearings would only drag out the already slow appropriations process. He also said that actual cost limitations imposed by appropriations units were the controlling factors in the scope of a defense program.

In other Congressional hearings, Army outlined plans to buy seven DeHavilland Caribou utility aircraft; 25 Grumman AO-1 Mohawk combat surveillance aircraft; and equivalent facilities for 57 Nike Hercules battalions to be ready by 1962.

Before the House, Navy has testified

that it will buy only 668 aircraft in fiscal 1960. This number is slightly less than the current attrition rates for Navy aircraft, and Navy officials pointed out that the amount of money they will receive will probably buy even less by the end of the year, as has been the case in past recent years.

Missile Destroyers Launched by Navy

Navy's first missile-carrying destroyers were launched in April this year. First of the two was the *Henry B. Wilson*, launched from Defoe Shipbuilding Co., Bay City, Mich. Second was the *Towers*, built at Todd Shipyard Corp., Seattle, Wash.

One destroyer that was converted to missile-carrying capability, the USS *Gyatt*, is already in commission. There are presently 18 guided missile destroyers in the Navy's shipbuilding program. The ships will be outfitted with Tartar surface-to-air missiles, and will carry integrated weapons control centers.

House Endorses Renegotiation Act

The House of Representatives has voted 378-7 to extend a slightly modified version of the Renegotiation Act for four years. The House successfully shot down a proposal by Rep. Carl Vinson to extend the Act permanently.

Amendments to the act provide for appeal of renegotiation findings beyond the tax court, and allow exten-

sion of the present two year loss carry-over to five years. Defense Department had requested that the act be extended 27 months.

Other changes would have the Renegotiation Board list factors leading to excessive profits determinations. This change follows a DOD request that allowance be made for incentive-type contracts.

Another amendment would force the Board to give preferential consideration to contractors using small business subcontractors extensively. The new measure would also require the Board to give contractors agency renegotiation reports and other non-classified documents pertaining to their case before the Board.

AF Logistics Net Ready in 3 Years

The Air Force Combat Logistics Communications Network will be ready to go in about three years, Air Materiel Command has announced. Final approval for the system was cleared through the Pentagon last month.

Core of the system will be five automatic switching centers that will be operated by Airways and Air Communications Service personnel, assisted by AMC technicians. The new system will use principles of electronic data processing as applied to communications, and will serve as a step to the complete automation of the Air Force supply system.

The new net will eventually replace the existing transceiver net that Air Force has. Initial centers will be in the Dayton area, Andrews AFB, and Oklahoma City, Sacramento, and San Bernardino Air Material Areas. The net will



Army is evaluating two of the Willys Motors, Inc. cargo/personnel carriers shown here. Made mostly of aluminum, the vehicles have six seats, four of which fold down to make the back of the vehicle suitable for cargo operations. Marine Corps also has two of the vehicles under evaluation.

be able to handle nearly 3-million punch cards daily.

It will integrate recording, collection, transmission, and receipt of information from AMC's customers in the field, using standard computer language that may be drawn from sources including magnetic tape, punch cards, and facsimile. All orders will be automatically routed, and the machine will set six levels of priority.

Overhaul Work Begun On P5M Anti-Sub Planes

The Martin Co. has received a \$15.4 million Navy contract to modernize the P5M-2 anti-submarine warfare aircraft. The contract is an extension of a program begun last year to modernize 85 P5M-1 aircraft.

The P5M-2 is the mainstay of Navy's present anti-sub seaplanes, and will be outfitted with longer-range detection gear during the modernization. The planes will also undergo complete inspection during the program.

Although it was unable to get funds this year, Navy is still in the market for a P5M replacement. Specifications for such an aircraft are currently in the works at Bureau of Aeronautics.

U. S. Equipment Goes To Norway, Netherlands

Complete Nike missile equipment, including radar, launchers, and vans, has been delivered by the Army to the 1st Norwegian Nike Bn. At the same time, Grumman Aircraft Engineering Corp. has announced that the Netherlands Navy will shortly send its S2F-1 Tracker ASW aircraft to sea aboard the aircraft carrier *Karel Doorman*.

Both deliveries are part of the U.S. Military Assistance Program (see p. 13, this issue). Members of the 191-man Norwegian Nike battalion have been trained at the U.S. Army Air Defense Center. First of the Trackers have already undergone initial evaluation by the Netherlands.

Data Processing Center Established by Navy

Navy has dedicated a new data processing center at its Philadelphia Aviation Supply Office. The center will be used to manage the 482,000 separate parts in Navy's aviation inventory.

The new center is the largest in the Navy Supply system, and the largest non-scientific computer complex in the Navy. Using two IBM 705 computers, the data processing center will handle stock level problems, information from the Chief of Naval Operations on air-

craft deployment, and parts requirements from Naval Aviation units.

Explaining the new system, ASO Commander Capt. J. J. Appleby said, "With 33,000 parts to stock for a single jet aircraft, and with 63 different types of aircraft in service, keeping minimum but adequate stockpiles where we need them is an enormously complex job. Essentially, the computers tell us what parts will be needed where and when."

Small Business Policy Stated by Air Force

Air Force is working to find situations in which small businesses can compete for prime contracts despite their size, according to Maj. Gen. William T. Thurman, production programming assistant to Deputy Chief of Staff for Materiel.

Speaking to a New York conference of large AF contractors, Thurman said that factors considered in AF procurement include location of the company capable of good performance, labor surplus factors, and company size.

Thurman said Air Force was concerned with "the large number of small, competent concerns which have something to offer, but which, solely because of their small size, or perhaps lack of ample financial reserves, are too often passed by..."

He said large contractors should cooperate in bringing small businesses into the defense industry, "without losing sight of quality, timely delivery and a fair price to the government."

Responsibility Changes For AMA's Set by AMC

Changes in the former responsibilities of Air Materiel Command's Air Materiel Areas have resulted from growth of the Air Force ballistic missile logistic support mission, according to AMC Headquarters.

Aim of the change will be to lighten the load now carried by San Bernardino AMA, which presently has full responsibility for missile support. Initial planning for the changes will be completed by 1 July, with final moves to be completed by the end of this year.

Plans call for Mobile Air Materiel Area to assume responsibility for B-66 aircraft support and support for Q-2 and Q-4 target drones. Warner-Robins AMA will take over logistics management for the B-45 bomber and C-47, C-54, C-117, and C-118 cargo aircraft.

In the final change, Middletown AMA will take over H-23 and L-17 logistic support management. No personnel changes will be involved.

SPACEFINDER FILES...

... HAVE PROVEN, in hundreds of government offices, that they can SAVE YOU 50% or more filing time, space and money!

Spacefinder's exclusive advantages...

1 Welded cabinet is designed specifically for MAXIMUM FILING EFFICIENCY. It is not an adaptation of shelving!

2 Spacefinders are complete, ready to use. When you move or change your department, you can MOVE THIS RUGGED FILE WITH CONTENTS INTACT!

3 Optional doors give DUST, DIRT and FIRE PROTECTION, serve as pull-out work shelves, and can be provided with locks.

NOTE visibility, availability of thousands of records.



IN USE BY GOVERNMENT
THROUGHOUT THE NATION

Send today to Dept. AFM, Tab Products Co., 995 Market St., San Francisco 3, for 24-page brochure on Spacefinder Files.

TAB

PRODUCTS CO.

For more facts request No. 109 on reply card.

Spot and prevent trouble at a glance



NEW! VU-BOARD®

BY THE ORIGINATORS OF WALL BOARD CHARTING AND PRODOC-TROL

Low cost — unlimited Visual Control

- Shows all important data—a fast, accurate, complete picture
- Easy to set up and operate—wall or desk use
- Boards fit together horizontally or vertically to increase item capacity
- Inserts can be shifted without removing from board
- Solves all machine load problems
- Unlimited uses for scheduling, charting, dispatching, etc. — in all phases of business and industry
- Light, compact all metal construction—designed for a lifetime

Only \$49.50 complete

PATENTED

Phone Westport, Conn. CA 7-4111 or write
WASSELL ORGANIZATION, INC.
Westport, Conn.

IN USE IN ALL BRANCHES OF GOVERNMENT
WRITE FOR NEW BOOKLET "VU-BOARD"

or
Consult our GSA Federal Supply Service Contract
FSC Group 74, Parts III & II,
GSA Contract Number GS-009-18325
Item Number 50-63

For more facts request No. 110 on reply card.



Research Rundown

ARMY'S COMBAT DEVELOPMENT EXPERIMENTATION CENTER HAS PROBLEMS, is beginning to look like a candidate for the ax it almost got last month. Scarce money has already closed a portion of the operation. More important: Many Army men feel CDEC is overlooking everything but the infantry, is not coordinating with Army's weapons testing boards. Chances look good that one of Army's better new ideas is going to be killed for lack of proper use.

POLARIS STORAGE PROBLEMS WILL BE MINIMIZED, development work made easier because of the built in temperature/humidity controls on the submarines which will carry the missile. While Air Force will have to fit Minuteman into virtually as many environments as it has sites, Polaris will be used in the already closely controlled conditions existing on submarines.

THE MAGINOT LINE OF THE MISSILE AGE is what Navy's top Development officer, VAdm. J. T. Hayward, has called the Nike/Bomarc defense system. This brings Navy in as the third party in the drawn-out haggling between Army and Air Force systems. In brief, Navy contends that a defensive attitude is historically poor, and that the Army and Air Force missiles are an expensive defensive effort that is showing few results.

NUMBER ONE HEADACHE FOR AF MISSILE TRAJECTORY PLANNERS is the lack of useable mapping information. Much of what they must work with is either inaccurate or out of date. This means errors can be as much as ten miles on—for instance—isolated missile sites that must be pinpointed. Answer appears to be a mapping satellite, although political considerations would seem to rule this out in the immediate future.

MARTIN CO. IS STILL NEGOTIATING WITH SAUNDERS-ROE of England, with an eye for backing Navy's claim to a spot in the nuclear aircraft program. Saunders-Roe would provide a Princess flying boat as a test bed, to be used with a Martin reactor. Present development work is just short of the mockup stage.

ARMY PLANS TO PURCHASE BRITISH-BUILT SELF-PROPELLED 105mm HOWITZER will bring a good weapon into inventory, but may create more problems than its worth. Ammunition for the T195 will be British-made, creating a supply problem and violating standardization principles. Same gun will be used on the new, highly-touted M-60 tank, with the same problems. Only explanation is that the British weapon is so clearly superior to anything that U. S. could come up with that we're forced to use it in spite of other disadvantages.

SUGGESTION FOR CUTTING LEAD-TIMES COMES FROM THE AIR FORCE, has to do with bottlenecks in the administrative area. Says one Air Force officer, "there is no reason why 'staffing and coordination' should take so long. It has to be done, but why not do it simultaneously, rather than in series, with everybody's name on the same buckslip." Also, the perennial gripe: "There are too many offices that have no responsibility, and the power to veto."

ARMY WORK WITH SOLID PROPELLANT ROCKETS is due to pay off in the next month or so. Work at Aberdeen Proving Ground is expected to yield a fuel with 10-15% better performance than anything to date. Specific impulse on the new fuel is expected to be stepped up from 235-240 to about 260.

INFRA-RED MISSILE DETECTION SATELLITES are beginning to look like a logical answer to the missile early warning problem. Advanced Research Project Agency's Project Midas has been termed "most promising" by Air Force, who is acting as executive agent in the work. Until such a satellite is ready to go, Air Force feels it can get along with aircraft carriers for the detection devices.

Miss
For

A m
be the
der co
mand
SAC o
million

Hea
704 co
placed
a staff
traject
are co
system
tingen
their t

The
gravin
needes
Air F
all int
far as
over b
job to
will b

ARI
Ann

Firs
reorga
Devel
nounc
ver, A

In t
Fergu
Sessu
this J
bury,
Specia
from
deput
ARDC

Ma
tant o
moves
the S
chang
chief
manag
will n
where
ment
for D
son.

Wea
To

An
212L
trol a
system
Electr
will b
be us

JUNE

Missile Center Planned For SAC Headquarters

A missile trajectory center which will be the first of its kind is currently under construction at Strategic Air Command Headquarters, Offutt AFB, Neb. SAC officials estimate it will cost \$5-million to get the new center going.

Heart of the system will be an IBM 704 computer, which will later be replaced by an IBM 709. The 709, and a staff of about 100 will pre-program trajectories for the ballistic missiles that are coming into SAC inventory. The system will account for "all the contingencies" in directing the missiles to their target.

The center will plot all geodetic, gravimetric and meteorological data needed to plot missile courses. One Air Force officer points out that "to all intents and purposes, the war—as far as missiles are concerned—will be over before it starts." He adds that the job to be handled at the new center will be to fight this pre-war battle.

ARDC Command Changes Announced by Schriever

First changes in the long awaited reorganization of Air Research and Development Command have been announced by Lt. Gen. Bernard Schriever, ARDC Commander.

In the first of these, Maj. Gen. James Ferguson will replace Maj. Gen. John Sessums, Vice Commander of ARDC this July. Maj. Gen. William Canterbury, present Commander of the AF Special Weapons Center, will take over from Maj. Gen. Leighton Davis as deputy commander for Research at ARDC.

Maj. Gen. Charles McCorkle, assistant chief of staff for guided missiles moves to Kirtland AFB to take over the Special Weapons job. In another change, Maj. Gen. Victor R. Haugen, chief of ARDC's directorate of systems management at Wright Patterson AFB, will move to the Pentagon in August, where he becomes director of development planning for deputy chief of staff for Development Lt. Gen. Roscoe Wilson.

Weapons Control System To Be Developed by GE

An Air Weapons Control System—212L—which will be designed to control a wide variety of weapons and systems will be developed by General Electric Co. for the Air Force. 212L will be either fixed or mobile, and will be used mostly outside of the U.S.

Radar, communications and data processing equipment will be included. GE will design data processing and display systems, as well as managing the overall program. The subsystem will be able to detect and track air targets automatically and rapidly. The transistorized system will be of modular construction.

On the Air Force side, management of 212L will be handled by ARDC's 212L Electronic Supporting System Project Office. Technical supervision will be provided by Rome Air Development Center at Griffiss AFB, N.Y.

Extensive Savings Seen For Minuteman by AF

An "economical breakthrough" has been predicted for the Minuteman solid-propelled missile by top Air Force Officials. According to Maj. Gen. Ben I. Funk's Ballistic Center, "if we attain all of our goals and get the achieved reliability that we anticipate, we will get across-the-board savings which will bring the system's cost/effectiveness down to about one-tenth of what present systems require."

Says Lt. Col. John Zoeckler, Deputy to Gen. Funk, "Minuteman will be the first major system that the Air Force has bought in 12 years with the promise of a real reduction of cost/effectiveness." Cost/effectiveness is the ratio between system cost, as compared with what it will do in mission performance.

Col. Zoeckler pointed out that this will be true in spite of the need to reduce warhead size on the Minuteman. Major savings, he indicated would be in ground support equipment, with the missile itself "by the pound, as expensive as anything else."

Col. Zoeckler added that even if all goals weren't attained, Air Force expects "substantial savings" with the new system. He also said that "anything would be better" than the ultra-expensive systems that are being bought by the Air Force now.

A-Plane Contract Near, Navy Wants to Get In

A phase 1 nuclear airplane design contract may be issued by the Air Force to Convair Division of General Dynamics and General Electric's nuclear engine division in the near future, says Lt. Gen. Roscoe Wilson, deputy chief of staff for development.

At the same time, it is expected that the Navy will put up a tough fight for an A-Plane program of its own. Navy

will argue that it has more need for the nuclear plane, with its requirements for anti-submarine and early warning aircraft. Navy feels that a missile-platform function would be the only one Air Force could justify.

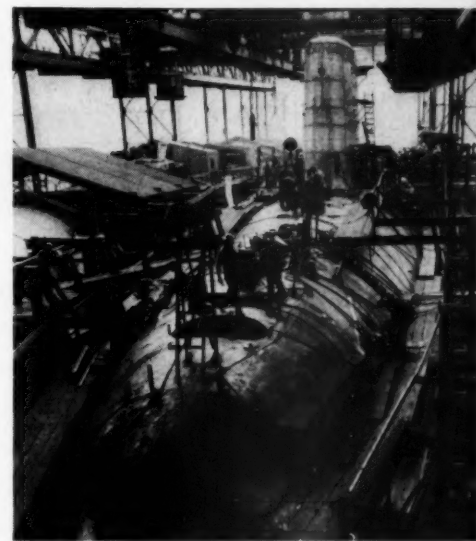
The A-plane program was broken loose by a decision by the late Deputy Defense Secretary, Donald Quarles, just prior to his death. In announcing its contract plants, Air Force said that 150 hours of operation have been logged on a J47 engine, using a GE direct cycle system as a couple with the reactor. Wilson also said that AF had solved the shielding problem, calling it "our final obstacle."

On the Navy side, The Martin Co. is still negotiating with Saunders-Roe of England for a Princess flying-boat, with plans to use that plane as a flying test bed for a reactor-powered turbo-prop engine.

Industry Developments

Douglas Will Handle ALBM Development Work

Douglas Aircraft Co. will design a two-stage solid-propellant ALBM (air launched ballistic missile) for Air Force. The missile will be used with such aircraft as the B-58 and B-52H,



First Polaris missile submarine—the *George Washington*—will slide down the ways at Groton, Conn. June 9 this year. The atom sub will be outfitted with its missiles and operational in the fleet during 1960, according to current Navy estimates. The last conventionally-powered scheduled for the Navy was launched last month at Portsmouth Naval Shipyard.

YOU'RE ON THE INSIDE...



You make your point before the conference begins when you advertise in *Armed Forces Management*. It's the *only* magazine offering across the board coverage of *all* the military services in the \$45 Billion Market. *Armed Forces Management* reaches 17,000 military and civilian executives in administrative, executive, procurement and evaluation positions. And you reach the *right* man in the *right* spot. AFM is addressed to job titles, not names, (majors through 5-star generals/admirals and civilian executives with Civil Service rating of GS-13 or above). This enables you to sell military purchasing influences month after month regardless of personnel rotation. *For a complimentary copy of the detailed Armed Services Marketing Manual, write Marketing Director, Armed Forces Management.*

AF **ARMED FORCES**
management

AMERICAN AVIATION PUBLICATIONS, INC.
1001 VERMONT AVENUE, N. W., WASHINGTON 5, D. C.

but v
craft
Ai
\$5-m
\$3.5
ibilit
the
was.
effor
wh
TH
and
low
1958
certa
chos
Forc
on t
usin
velop

Dr
Un

L
Aero
to d
usin
Lock
Lock
the
L
nour
Eng
natio
elect
mili
has
tron

Ma
On

A
be c
the
part
The
ply
Fore
F
part
grow
part
ible
Arm
men
with
For
T
air-
othe
whi
AFM
"sin
ven
solv
mak
cost
be
JUN

but will not be used on advanced aircraft like the B-70.

Air Force said it has already spent \$5-million with The Martin Co. and \$3.5-million with Lockheed for "feasibility demonstrations to determine if the concept was sound and found it was. Reports of the results of their efforts were given to all 15 contractors who submitted proposals."

The Air Force also said of these and other study contracts "These were low cost contracts initiated with fiscal 1958 funds in early 1958 to obtain certain technical data for use by the chosen contractor for the ALBM." Air Force stated that further development on the ALBM will be a team effort, using many components already developed.

Drone Launch System Under Development

Lockheed Aircraft Corp. and Ryan Aeronautical Co. are working together to develop a drone launching system, using the Ryan Firebee drone and the Lockheed C-130 Hercules. The big Lockheed plane has carried four of the drones on a recent test flight.

Lockheed officials have also announced plans to merge with Stavid Engineering, Inc., to form "one of the nation's most complete aircraft-missile-electronic teams." Stavid specializes in military electronics, while Lockheed has recently been expanding its electronics work.

Martin Begins Work On Small Reactor

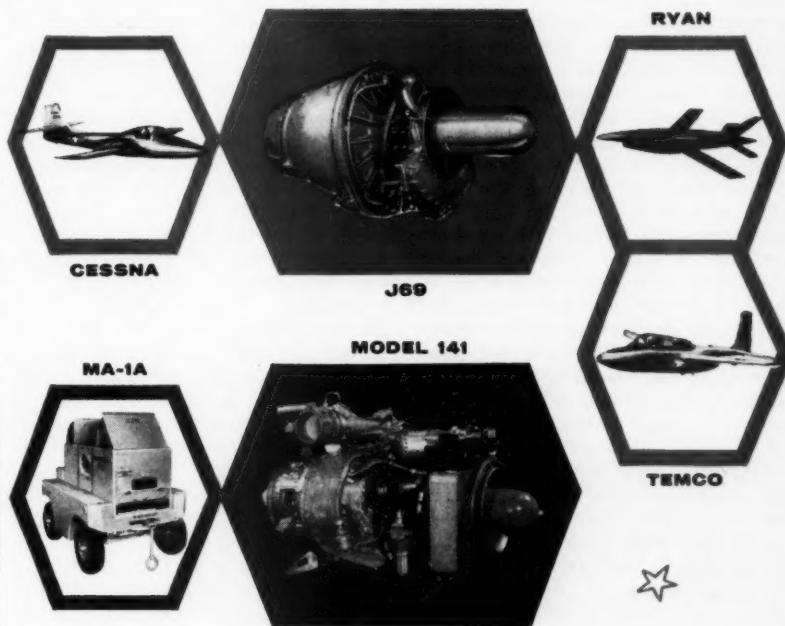
A portable atomic power plant will be developed by The Martin Co. for the Air Force in a newly-formed department of Martin's Nuclear Division. The reactor is being designed to supply heat and electricity for an Air Force station in Sundance, Wyo.

Fred Hittman will head the new department, which Martin calls "an outgrowth of the Reactor Systems Department." The group will be responsible for all contract work with the Army Engineer Research and Development Laboratories, besides its work with the PM-1 system for the Air Force.

The prefabricated reactor will be air-transportable, and would have other applications than the one for which it is being planned. (see April AFM, p. 40). According to Hittman, "since they don't require bulky conventional fuels, such power plants will solve a major logistical problem by making these bases independent of costly supply lines, which might easily be cut off . . ."



Building Tomorrow's Power



Continental Aviation & Engineering Corporation has more than 10 years' experience with small gas turbine engines. . . . Four versions of the J69 turbojet—delivering 920 to 1700 lbs. thrust—are in operation today. . . . The Model 141 turbine air compressor engine is widely used in jet aircraft ground support equipment. . . . Research and development programs are continuously in process on uprated turbines, new turbine configurations, solid fuel propellents, and solid fuel ramjet vehicles.



CONTINENTAL AVIATION & ENGINEERING CORPORATION

12700 MICHIGAN AVENUE, DETROIT 18, MICHIGAN

SUBSIDIARY OF CONTINENTAL MOTORS CORPORATION

Pentagon Profile

This Month:

Vice Admiral J. T. Hayward

Deputy Chief of
Naval Operations (Development)



NORMALLY, such an out-of-the-way office as room 5D600 in the Pentagon attic would be a fine spot for quiet contemplation of the problems of Navy research and development. (Easiest way to reach the place is up a back stairway.) But John Tucker Hayward, like the man owning a better mousetrap, has become, to use his own words, "a man in orbit."

At one time or another lately, nearly every top-flight official in the Washington military setup finds it necessary to visit Hayward. He, on the other hand, finds it necessary to hold business conferences while walking down the hall to other business conferences—just to get everything done. By sheer force of his own impressive talent and driving energy, he is becoming one of those near-indispensable men in building tomorrow's nuclear-powered Navy. On a first-name basis with most of the nation's leading scientists, Hayward's solid thinking and Horatio Alger record have earned him a respect within the scientific fraternity few other military officers enjoy.

For that matter, his new job title (as the Navy's first Deputy Chief of Naval Operations for Development) is pegged by many observers as little more than an official Navy endorsement of the position he already held in fact. Hayward, however, says, "This new organization will help a lot. The Navy has needed some one spot where the boss (Arleigh Burke) could go to find out how we stand in R&D—without having to hack at this thing in 20 different places."

As DCNO/Development, Hayward is on an organizational par with Army's Trudeau, Air Force's Schriever, can act now with the weight of authority where he once measured progress by how good a selling job he did. His fans are already predicting that, teamed with Navy research chief Rear Admiral Rawson Bennett ("We understand each other very well"), he will make "fur fly" in the R&D business.

Being in the middle of the commotion will be nothing new for Hayward. He has been there most of his life. The son of one of the nation's first aviators and aeronautical engineers (Charles B. Hayward), he was born in New York City in 1908. When he was 15, he decided he wanted to be a flier

and, therefore, saw no point in finishing high school.

He dropped out in his junior year and enlisted in the Navy. His immediate goal: Annapolis. Reporting in at Newport, he was stopped by an old boatswain's mate who roared at his escort, "Where the hell did you get this young chicken?" He has been "Chick" Hayward ever since.

Fifteen months later he received an appointment to the Naval Academy from then-President Calvin Coolidge, graduated in 1930. On a wall in his office, alongside the "Ten Commandments of Satchel Paige," is a Coolidge quotation: "Nothing in the world can take the place of persistence."

Designated a Naval Aviator in 1932, his own persistence led him into hours of self-tutoring on theoretical physics when, as a test pilot, he looked around for something to study that had no apparent connection with the Navy. (That same year he married Leila Hyer. "As I recall," says Hayward, "the two events were not related." They now have four daughters and one son.)

A combat pilot in Europe and the Pacific during World War II, he earned the Silver Star, Legion of Merit, Distinguished Flying Cross (four times, once from the Army), the Air Medal (five times), the Purple Heart. The first Naval aviator to land heavy attack aircraft on a carrier, he now has over 12,000 flying hours, pioneered developing the Navy's present heavy attack squadron operations.

His theoretical physics paid off at the tail-end of World War II when he was assigned to study the atomic bomb, was on the Alamogordo, N.M., flatlands when the first nuclear explosion went off in 1945. He was promptly placed in charge of putting the atom into the fleet, later did a tour of duty with the Atomic Energy Commission, followed that with a year at sea commanding a carrier escort vessel, then ran the Naval Ordnance Laboratory from 1954 to 1956.

He was at sea commanding the giant aircraft carrier *Franklin D. Roosevelt* when Arleigh Burke started looking for a man to run his research and development program. Most-logical-choice Hayward was called into Washington, named assistant CNO for research and development in mid-1957. His present

title is "a natural progression from there." Burke, in fact, had already picked him to be the first DCNO/Development even before the Navy's Committee on Organization had officially recommended that such an office be set up at all.

Chick Hayward's naval career has been shaped largely by his love of science and of flying. (In one of his recent trips to Capitol Hill to testify about one thing and another, he told Congress he was just "a gung-ho pilot and physicist third class.") His rapid rise through the ranks has marked him in Navy circles as a determined, outspoken sailor with a clear idea of where he stands, where he intends to go—and how to get there.

Nor does he appear reluctant to sound off if he thinks the operation isn't running right. Recently, he urged that all space exploration be placed under one civilian agency, an opinion not only contrary to Administration policy but at odds with the exhortations of many of his military colleagues—but, from a management standpoint, a sound contention.

His ideas on career specialization also run counter to the generally held opinion of Navy officer specialists. Strangely enough, he uses the same reasons as the opposition to reach a different conclusion. Pointing to a desk model of the A3J attack bomber, in whose development he had a large-sized influence, he said, recently, "These weapons are becoming too complicated to handle on a part-time basis. A man has to devote his career to one of them, learn how it's put together and how it operates. We've gone too far into specialization. We've got to get the man on shore and the man at sea closer to understanding each other's problems."

In setting up his own Development organization, one goal will be to delegate as much authority as possible to the men under him, presumably pushing them closer to the fleet. The problem: "It's very easy to draw an organization chart on a piece of paper. It's when you begin to put names in the boxes that things get sticky."

Basically, the men now working for him are cut from the same mold. Their unconcealed admiration for the boss gives his office an *esprit* rare even in military circles. An enthusiastic fountainhead of new ideas (latest example: setting up a nine-nation oceanographic research project at La Spezia, Italy), Hayward will pump his arguments at anyone who will listen. In his new office, Hayward's calm, determined manner of presenting way-out ideas in feet-on-the-ground language is going to make it hard for even his occasional critic to beat him down.



Newsletter

Armed Forces Management Association

Washington 25, D.C. Phone: OTis 4-7193

National President: Rawlings S. Poole

Executive Director: VAdm. Harry E. Sears, USN, ret.

5th Annual Conference

Keyed to the thought provoking theme of "The Role of Management in the Collapse of Time," AFMA Fifth Annual Conference held 26-28 May outstripped previous efforts in this important area of Association activity. A principal medium for the achievement of AFMA objectives of management improvement in Defense through the exchange of management knowledge, this year's Conference provided a threefold program of professional guidance and education for the membership and other attendees, a closer liaison between defense, industry, and education in the field of management, and social activity in a community of common interest.

Board of Directors Meet

First order of business, May 26, was a luncheon given in honor of the new members of the Board of Directors of AFMA and Chapter Presidents of the Association. Welcomed by the National President at noon in the Flag and General Officers Lounge of the Pentagon, new board members honored included: LGen Roscoe C. Wilson, USAF, DCS Development; VAdm O. S. Colclough, USN (Ret), President of George Washington University and Chairman of newly formed AFMA Educational Institutions Advisory Council; Edward A. Bacon, Dep. Asst. to Sec Army (FM); MGen Roy M. Gulick, QMG, USMC; Thomas A. Callaghan, Jr., Aeronutronics Systems, Inc. of Ford Motor Co., and Chairman, Industry Advisory Council; VAdm Edward W. Clexton, Chief Navy Material; LGen James F. Collins, USA, DCS Personnel; J. Robert Loftis, Admin. Asst to SecDef; BGen Chester R. Allen, Asst QMG, USMC; John H. Dillon, Admin. Asst to SecNav; Edward G. Witting, Dep. Dir. R&D Army; Edward G. Witting, Dep. Dir. R&D Army; and John J. McLaughlin, Admin. Asst. to SecAir Force.

Note: Board Members continuing in office for the coming year include: Rawlings S. Poole, OSD; Howard K. Hyde, OSD; Carl Freedman, D/A; Edmund D. Dwyer, Chief Navy Management; MGen L. R. Dewey, USA; W. T. Ellis, Jr.; Harry L. Headley, D/A; Col. S. R. Stribling, USA (RET); MGen Robert W. Ward, D/A; John Westgate, NGF, D/N.

Following luncheon, the annual business meeting of the Association was conducted. Highlights: a progress report by the Executive Director and functional vice presidents; a financial report by the Treasurer; and plans for the coming fiscal year. In a nut shell: The Association is thriving; its finances are in excellent shape; membership is up sharply (corporate 600 per cent; individual 60 per cent; chapters, 2 chartered, 100 per cent potential in those forming). Plans: better service to the membership through improved membership and periodicals circulation control; Expanded industry and educational institutions program; improved guidance for chapters forming and in operation through completed chapter manual and program guidelines; improved services to the corporate membership. It was announced that Mrs. Margarite L. Snyder will become Administrative Officer on 1 June relieving Mrs. Esther V. Campbell, long time AFMA worker.

Conference Sessions Valuable

As outlined in May issue of AFM, General Sessions of Conference covered a wide spectrum of military and non-military management activities. Addressing the conference were Secretary of the Army Brucker; Dep. Asst. SecDef LeBoutillier, Mr. John M. Macy, Executive Vice President, Wesleyan University; Mr. J. Lewis Powell, Conference Keynote, and many ranking military and civilian executives of the Defense Establishment speaking in their specialty areas. In addition, two chapter presentations—Rome, New York, and Hawaii—proved of much interest.

Of particular significance was industry's contribution to the program. With speakers drawn from Congress, industry, and Defense, speaking to the problem of the reduction of lead time, the presentations, panel discussion and general question period which followed produced a session of great immediate and potential value to our Defense management effort. Moderated by VAdm. E. W. Clexton guest speakers included Sen. Leverett B. Saltonstall, John M. Sprague, OSD, Dr. William H. Martin, D/A, August C. Esenwein, Executive Vice President, Convair Division of General Dynamics Corporation, and Mr. John Corson, Director, McKinsey and Company.

10 YEARS OF TROUBLE-FREE SERVICE WITH **BELCO** BALL BEARING FAUCET STEMS



NOTE THE BALL-BEARINGS

BELCO ball bearing stem races are Aluminum Silicon Bronze which is impervious to dezincification, the destroyer of ordinary brass faucet valve stems. Ball bearings and bibb screws are stainless steel. BELCO bibb washers are made of Buna-N, compounded to withstand high temperatures, give long, leak-proof life. BELCO ball bearing faucet stems are supplied by leading brass goods manufacturers when specified. Old, defective faucet stems can be replaced with BELCOS through a convenient monthly budget plan. Call or write us for complete information and free sample. Send a sample stem for conversion and quotation without obligation.

BELCO DIVISION
MILLER MANUFACTURING COMPANY
17640 Grand River • Detroit 27, Mich.



*BELCO bibb washers will give ten years of trouble-free service under normal usage because ball bearings convert friction to pressure, eliminating the grinding that causes leaks.

For more facts request No. 105 on reply card.

Awards Banquet Is Successful

Contributing substantially to the overall success of the conference was the Awards Banquet held 27 May.

Recipients of National Awards in order of presentation with a brief of citations follows: *Corporate Membership Certificates*: Thiokol Chemical, Lockheed Aircraft Corp., International Telephone & Telegraph Corp., The Garrett Corp., General Dynamics Corp., National Cash Register Co.

AFMA Service Award, to the group, organization or company which has made the greatest contribution to the improvement of management in the Armed Forces:

(1) Member: Aeronutronic Systems, Inc. of Ford Motor Company, Thomas A. Callaghan, Jr., Eastern Rep.

(2) Non-member: American Aviation Publications for its *ARMED FORCES MANAGEMENT* magazine, Wayne W. Parrish, Publisher.

The AFMA Literary Award, for the individual member who, in the past year, has made the outstanding literary contribution to the work of the Association; Mr. Gordon O. Pehrson, Special Projects Office, Navy Department.

The AFMA Merit Award, to a non-member who has made the most outstanding contribution to the improvement of management in the Armed

Forces, the Honorable Donald A. Quarles, Deputy Secretary of Defense (posthumously).

Honorary Life Membership Award, for outstanding contributions to and support of the work of the Association: Senator Leverett Saltonstall, LGen Ruffner, CG, Third Army, RAdm William H. Leahy, Commander, Norfolk Naval shipyard, and MGen Clyde Mitchell, Commander Rome Air Material Area, Colonel Paul O. Hoffman, HQ Comdt, D/A.

AFMA Chapter Charter, to qualified, newly formed chapters: Gosport Chapter, Virginia #33, RAdm W. H. Leahy, President.

AFMA Life Membership, to individuals taking out a Life Membership in the Association: Mr. Frank B. Hubachek, of Hubachek & Kelly, Lawyers, Chicago.

The AFMA Outstanding Chapter Award, to the outstanding chapter of the Association based on membership factors, comprehensiveness of its program and public relations effort: Fort Benning Chapter, Georgia #13, Colonel Robert S. Cain, President.

AFMA Achievement Award, to the individual member who has made the most outstanding overall contribution to the work of AFMA, VAdm Harry E. Sears, USN Ret, for the Association's progress and growth in the past year.

EDP Solves a Problem . . .

(continued from page 28)

both contractor and the depot to do preproduction planning.

4) In almost all cases, kits are provided to cover the materials needed for modifications. The new electronic data processing program maintains a record of kits available for installation by aircraft serial number. Action necessary to secure kits is known before the modification due date. Modification dates and kit lead time can be reconciled so that kit and aircraft are in the overhaul facility at the same time.

5) Precise work specifications end costly inspections to determine if an applicable TO has been completed. This should reduce contract costs by at least two percent, which in end result will aggregate millions of dollars.

Completion of a TO usually changes the aircraft in some way. These changes will be integrated through electronic processing and will produce what are known as Selected Systems Reports, relating to TO compliance to the systems effected to show nomenclature of the new or modified equipment.

Benefits from the Selected Systems Reports include:

a) An aircraft possessing a particular modified system may be rapidly identified. Any of many systems combinations may be made and the aircraft possessing them can be isolated.

b) Strategic Air Command has arranged to use this Selected Systems data as direct input on its own computer system.

Another important product of the program is a summary of funds by budget project required for modernization/maintenance programs:

1) All back-up data are retained in accessible form, permitting reviewing authorities to save time by considering only the summary report. Questions can be answered by furnishing back-up information as needed. Also, summary-type reports will winnow the facts for decision from the original mass of source data.

2) Schedule changes formerly meant laborious hand computations to arrive at fund costs. Now they may be processed by the computer systems.

3) The electronic data processing program can be made selective and can quickly consider the cost of modifications.

Thus it is that modern electronic data-processing is streamlining one complicated Air Force logistical problem, contributing to increased efficiency in the defense of our country and its allies, and at the same time substantially reducing costs.

FREE FROM HARRIS, UPHAM & CO.— THIS NEW INVESTMENT GUIDE... FOR SERVICE MEN AND WOMEN

Now you can get advice on building for your financial future from a specialized service devoted exclusively to helping military personnel with their investment problems. Harris, Upham & Co.'s Armed Forces Department has supplied information and guidance to thousands of officers and enlisted men over the past three years. Staffed with former service men and backed by Harris, Upham's extensive research facilities and nationwide network of offices, this Department is uniquely equipped to offer the kind of investment help you need—whatever your financial objectives may be or wherever you may be stationed. A new revised, enlarged edition of Harris, Upham's "Military Investment Manual" has just been published, describing this service and giving valuable information on the fundamentals of investing, selecting stocks, and setting up a program of your own. Included is information on periodic investment plans either through purchase of New York Stock Exchange listed stocks or mutual funds recommended by Harris, Upham's Research Department. For your free copy of this interesting and informative booklet, clip and mail the coupon today.

ARMED FORCES DEPARTMENT, HARRIS, UPHAM & CO.

Members New York Stock Exchange

1505 H Street, N.W., Washington, D.C., Att: General John E. Dahlquist, USA Ret.

Gentlemen: Please forward promptly a free copy of "The Military Investment Manual"

Name _____ Rank _____
Post or _____
A.P.O. _____ City _____ Zone _____ State _____

Your Investment Future

INVESTING ON A BUDGET

Some people contend that the only good thing to be said for a budget is the fun of ignoring it occasionally. And everyone will admit that there's nothing more pleasant than a sirloin-on-the-town after a steady diet of hamburger-at-home.

But all the same, budgets have a way of bringing results.

Take investing, for example. Five years ago, the American public was offered a method of acquiring common stocks by investing a small amount of money on a regular basis. This program is called the Monthly Investment Plan—or, more commonly, MIP. What it amounts to is investing on a budget.

So far, more than \$125,000,000 has been invested through MIP. And the figure keeps merrily climbing every day, as more and more people decide that they, too, can afford to set aside at least \$40 a month, or \$40 a quarter to purchase shares in America's leading companies.

One of these new investors—a New Jersey army man accumulating shares in a public utility—says that MIP “is no different than going to the grocery, although a lot of people think there's something mysterious about it.” Buying stock is more serious business than grocery shopping, of course, but otherwise the fellow is correct. The normal emphasis on a budget makes this investment program all the more suitable for many armed forces families.

If you happen to be interested in the MIP method of becoming an investor, there are ways of going about it.

Always remember that there are risks—as well as rewards—in owning common stocks. Under the circumstances, you wouldn't consider investing unless you have adequate savings to see you through family emergencies. Many people lose money on stock investments because they have to sell to meet emergencies.

MIP is offered through Member Firms of the New York Stock Exchange. Go to see a broker of your choice, and discuss your investment aims with him. Ask his advice on investment opportunities best suited to your particular needs. He will obtain the latest available information on any company or industry that might interest you. His professional advice, based

on knowledge and experience, will cost nothing at all.

Decide on a stock you want to buy. You can choose from some 1,200 Stock Exchange Stocks. Tell your broker how much you can afford to invest—on either a monthly or quarterly basis. (The minimum payment is \$40—quarterly; maximum is \$1,000 monthly.) Also decide whether you want dividends re-invested automatically, as the majority of MIP investors do.

Your broker will do the rest, investing each of your payments and sending you a receipt showing the number of shares you purchased, the price paid, total shares held and the normal commission charge. Ordinarily your broker will hold your shares until you have acquired 50 or until you close your account—maybe to start buying another stock.

There is no contract, and you can stop your MIP payments at any time.

Another big feature of MIP is that a family can take advantage of what the experts call Dollar Cost Averaging. With this technique a fixed dollar amount buys more shares when prices are low and fewer when they are high. And so the actual cost per share is automatically less than the average market price if the long-term market trend is upward.

For the sake of illustration, assume that the market price of a particular share of stock fluctuates from \$40 to \$20 to \$60 over a three month period. An investment of exactly \$40 each month would buy varying amounts of stock: one share, two shares, two-thirds of a share. In other words, while the average price during the span amounts to \$40, you would acquire three and two-thirds shares for your \$120—only \$32.75 a share. You're ahead.

Of course Dollar Averaging works out to an investor's advantage only when the long trend of the market is rising. But for all its fluctuations, the arc of the market has gone up for more than 58 years now.

MIP is not a “get rich quick” program. As any good broker will tell you, no investment system is 100 per cent foolproof. But in these days of budget buying, MIP offers a way to add soundly chosen stocks to the family nest egg. And how many families don't want a nest egg hatching for the future?



Keystone Fund of Canada, Ltd.

A fully managed
Mutual Investment Company
seeking long-term
CAPITAL GROWTH in the
expanding Canadian Economy

The Keystone Company
50 Congress Street, Boston 9, Mass.

Please send me prospectus describing the
Keystone Fund of Canada, Ltd.

Name

Address

City State

AF-1

For more facts request No. 107 on reply card.

Common Stock Investment Plan

For as little as \$10 a month you
can purchase shares in
HAMILTON FUNDS. Hamilton is
an investment fund holding
common stocks of over
80 corporations, selected for
income and growth possibilities.

Hamilton Funds

HAMILTON MANAGEMENT CORP.
Dept. H-4 Box 5061, Denver 17, Colo.

Please send prospectus-booklet without
obligation.

Name

Address

City State

For more facts request No. 108 on reply card.

How To Get Things Done Better And Faster



BOARDMASTER VISUAL CONTROL

- ☆ Gives Graphic Picture—Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate—Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ☆ Made of Metal Compact and Attractive. Over 350,000 in Use

Full price \$49.50 with cards

FREE

24-PAGE BOOKLET NO. AM-50
Without Obligation

Write For Your Copy Today
GRAPHIC SYSTEMS

55 West 42nd Street • New York 36, N. Y.
For more facts request No. 112 on reply card.

INVENTORY CONTROL

Signalled facts

STAY FACTS

with **SIG-NA-LOK®**

No undesired slipping of signals.



with **SIG-NA-LOK®**
SIMPLIFIED INVENTORY CONTROL

Sig-Na-Lok visible control puts your inventory at your fingertips. Every fact needed for effective control is signalled and the signals are locked until the facts change. In one complete record, you'll always know exactly what's on hand and when to reorder. Take the guesswork out of inventory—switch to Sig-Na-Lok and you'll

- Prevent over stocks
- Increase turnover
- Eliminate out of stocks
- Decrease costs—
increase profits

Creator of Effective Tools for Effective Management

Phone Westport, Conn. CA 7-4111 or write
WASSELL ORGANIZATION, INC.
Westport, Conn.

IN USE IN ALL BRANCHES OF GOVERNMENT
WRITE FOR NEW BOOKLET "SIG-NA-LOK"
SIMPLIFIED INVENTORY CONTROL

Consult our GSA Federal Supply Service Contract
FSC Group 74, Parts III & II,
GSA Contract Number GS-909-18328
Item Number 50-65

For more facts request No. 111 on reply card.

48

Advertiser's Index

Air Transport Association	27	Management Control Charts Co. . .	35
Belco Div., Miller Mfg. Co.	45	National Co., Inc.	Cover 2
Bristol Aircraft, Ltd.	11	Northrop Corp.	20, 21
Caterpillar Tractor Co., Domestic Products Div.	2	Pan American World Airways, Inc.	1
Continental Aviation & Engrg. Corp.	43	Philco Corp.	34, Cover 4
Dictaphone Corp.	24, 25	Radio Corp. of America	12
Electro Tec Corp.	4	Ind. Electronic Products Div. ..	31
Graphic Systems, Inc.	48	Railroads of the United States ..	32
Hamilton Management Corp., The	36, 47	Stromberg-Carlson	8
Harris, Upham & Co.	46	Tab Products Co.	39
Keystone Co., The	47	Teletype Corp.	29
Le Tourneau-Westinghouse Co.	Cover 3	Wassell Organization, Inc. 35, 36, 39, 48	
		Westinghouse Electric Corp., Defense Products Group	6, 7

Dates to Circle

June 7-13

Advanced missile and rocket system design seminar—Pennsylvania State University.

June 14-27

Sixth Annual Material Handling Training Course—Lake Placid Club, N.Y.; sponsored by the Industrial Management Center.

June 16-19

Industrial Engineering Seminars—Cornell University, Ithaca, New York.

June 21-July 10

Three-week management training program—Lake Arrowhead Conference Center of the University of California.

June 22-25

British Computer Society First Annual Conference—Cambridge, England.

June 23-25

Aviation Distributors and Manufacturers Assoc., 33rd meeting—St. Francis Hotel, San Francisco.

June 24-26

National Machine Accountants Assoc., national conference—Chase-Park Plaza Hotel, St. Louis, Mo.

July 6-10

Institute in Technical and Industrial Communications—Colorado State University, Ft. Collins.

July 12-25

Army Logistics Management seminar—Ft. Lee, Va.

July 13-17

One-week course for executives and managers on basic concepts in atomic energy and radiation technology presented by U.S. nuclear scientists—simultaneous presentations at Berkeley and Los Angeles, Calif.; sponsored by University of California, University Extension.

July 25-August 8

Army Logistics Management seminar—Ft. Mason, Calif.

July 29-31

First Annual Midwest Office Systems Workshop and Exhibit—Armory, Waukegan, Ill.; sponsored by Hq., Ninth Naval District, in cooperation with Great-Lakes-area Army, Air Force and Marine Corps Hq.

July 30-31

Sixth Annual Symposium on Computers and Data Processing—Stanley Hotel, Estes Park, Colo.; sponsored by Denver Research Institute.

August 4-5

Second Annual Western Regional meeting, American Astronautical Society—Ambassador hotel, Los Angeles, Calif.

AN FITTINGS & HARDWARE

Stainless, Aluminum, Brass, Steel
All sizes—immediate delivery from world's largest shelf stock. Buy direct from manufacturer. Lower prices—quicker service. Send for free wall charts showing complete line of AN & MS fittings and hardware. We also machine parts to your own special print.

COLLINS ENGINEERING CORPORATION
9050 Washington Blvd., Culver City, California

ARMED FORCES MANAGEMENT

This big tractor has the power, weight, and traction to handle most of your dozing, pushing, and pulling assignments . . . plus the easy-rolling advantage of big rubber tires that take it anywhere, over any surface, under its own power. It does more work, in less time, at big savings in operating, maintenance costs.



SPEED is your answer for widely-scattered tractor work

If your tractor assignments call for a machine that can go to work anywhere . . . anytime . . . without expensive delays waiting for haul equipment . . . check on mobile, rubber-tired, 218-hp Tournatractor®.

This LeTourneau-Westinghouse tractor-on-rubber can *drive* to the next pulling, pushing, or dozing job at a moment's notice. It moves along highways, city streets, or cross-country . . . through sand and mud . . . at speeds to 17 mph. On the highways, it rolls fast enough so that it will not interfere with traffic.

L-W tractor's wide, low-pressure tires straddle railroad tracks, safely

cross trestles and bridges. You need no extra manpower, no special transport equipment.

Handle long dozing cycles efficiently . . . economically

Once on the job, Tournatractor's fast work-speeds on rubber step-up operations . . . make long dozing, pushing, or scraper-operating cycles practical and profitable.

Pick-up is fast, because of L-W tractor's sealed, anti-friction, 4-wheel drive. Air-actuated power-shift transmission allows operator to shift gears on the run, losing no momentum. Even reverse shift is instant.

Electric controls — simplest system of all

Another big advantage of the Tournatractor is its simple operation. Even untrained men become good operators in a very short time.

Tournatractor's electric controls are easy-to-understand, easy-to-reach. One-hand, one-motion clutch-less shifting . . . plus the many safety features . . . mean men will use higher speeds more often.

Call or write us for details on fast-stepping, "go-anywhere" Tournatractor. Ask us to show you the L-W rubber-tired tractor in action on assignments of your choice.

CT-1902-DC-1



LETOURNEAU-WESTINGHOUSE COMPANY
A Subsidiary of Westinghouse Air Brake Company

FACTORIES in Peoria, Illinois; Toccoa, Georgia; Indianapolis, Indiana; Sydney, Australia; and Campinas, Brazil

Where quality is a habit

Government Sales Dept.

Peoria, Illinois Ph. 3-4521
916 Ring Bldg., 1200 18th St. N.W.
Washington 6, D.C. Ph. Republic 7-7445
994 Pacific Electric Bldg., 610 S. Main St.
Los Angeles 14, Cal. Ph. Michigan 9-717



it's
1492 again...
in outer space!

Philco Ground-Space Communications System commands and tracks **DISCOVERER** satellite

DISCOVERER . . . the United States' newest earth satellite . . . is opening new vistas on the frontier of outer space. And Philco is proud to play an important role in this renowned achievement as a part of the Discoverer Team . . . in conjunction with the Lockheed Aircraft Corporation and the Air Force at the direction of the Advanced Research Projects Agency of the Department of Defense.

As the subcontractor for Discoverer's entire communications system, Philco designed and developed the vast complexity of ground-space communications, tracking, commanding and data gathering and processing systems.

The Philco-designed and equipped system observes and commands Discoverer through a series of

five tracking and data collection stations in Alaska, California, Hawaii and a specially equipped ship at sea. Philco continues its participation in the Discoverer Program by assisting in the actual operation and maintenance of the communications and data handling network.

Philco's part in the Discoverer Program is typical of the many and diverse advanced research and development activities being conducted in our laboratories on the East and West Coasts where outstanding career opportunities abound for Engineers, Mathematicians, and Physicists.

In the wonder-world of advanced electronics, look to the leader. Look ahead . . . and you'll choose Philco!

PHILCO®

GOVERNMENT AND INDUSTRIAL DIVISION
WESTERN DEVELOPMENT LABORATORIES
PHILADELPHIA, PENNSYLVANIA PALO ALTO, CALIFORNIA